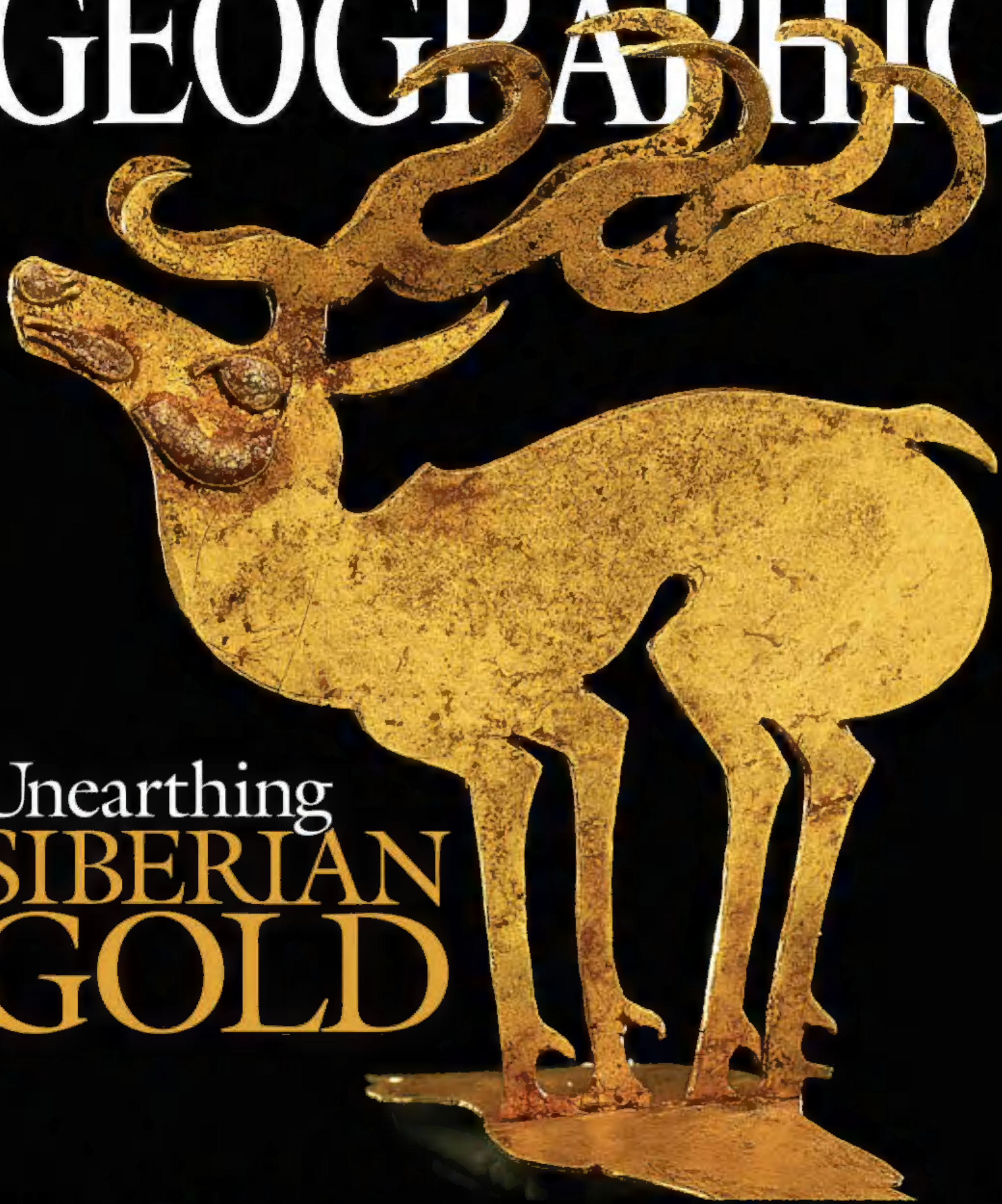


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GOLD**

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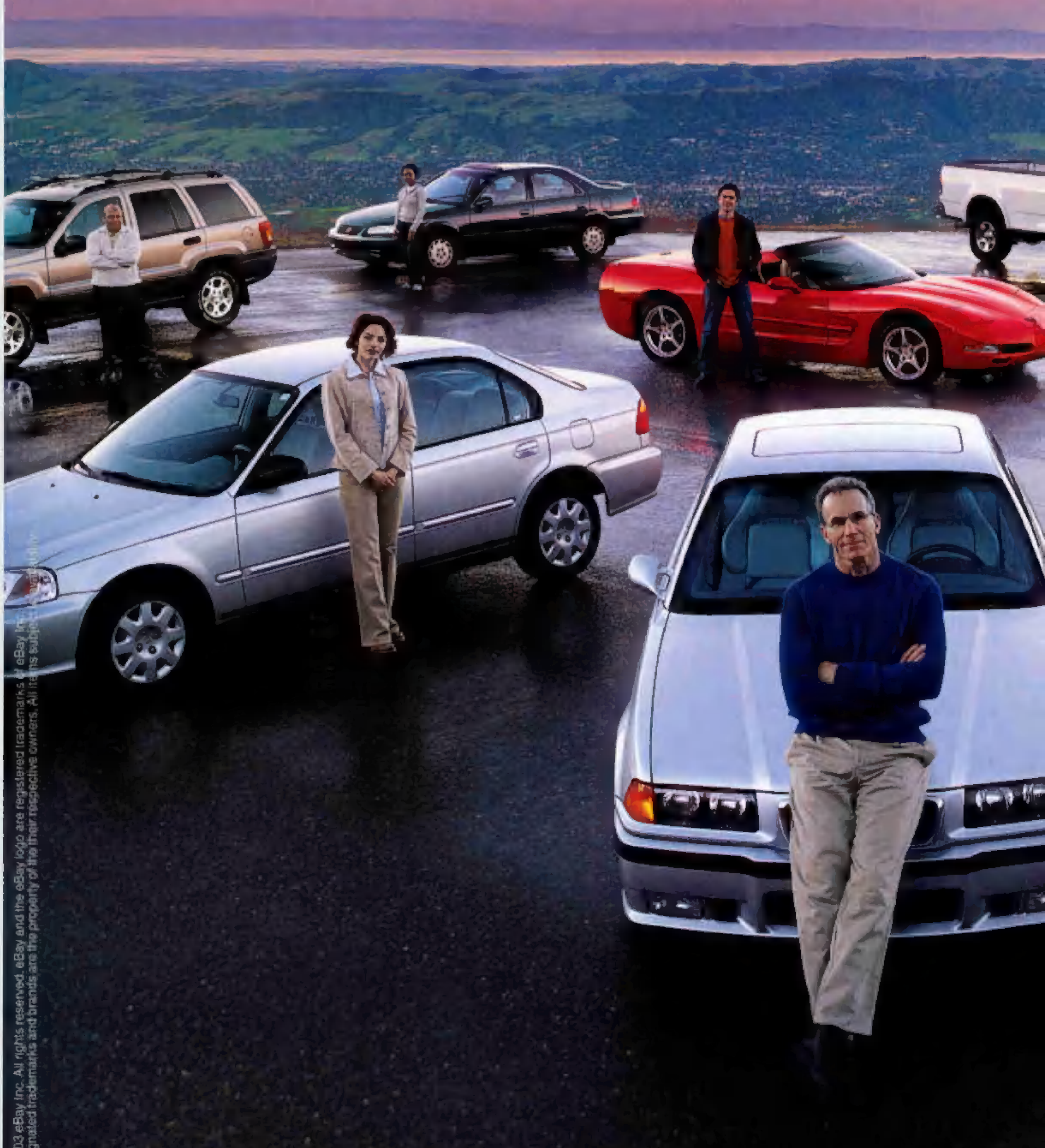
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Bonobo
(*Pan paniscus*)

Size: Head and body length, 70-82 cm; no tail

Weight: 30-45 kg

Habitat: Lowland rain and swamp forest in the central Congo Basin, south of the Congo River in the Democratic Republic of Congo

Surviving number: Estimated at fewer than 10,000

Photographed by Frans Lanting

WILDLIFE AS CANON SEES IT

A kiss is just a kiss. But it isn't every day you see one in the wild. The bonobo is an exception: wonderfully expressive, it is able to laugh and frown as well as smile and kiss. It also has a repertoire of gestures, including signals to request food or grooming. These are just a few of the traits this peaceful great ape shares with humans; it also has a strong mother-child bond, with the bonobo mother carrying her infant and keeping her

young with her almost constantly. In fact, bonobos and humans share over 98% of the same genome. Yet humans are imperiling the survival of bonobos through deforestation, hunting and capture for the pet trade.

As an active, committed global corporation, we join worldwide efforts to promote awareness of endangered species. Just one way we are working to make the world a better place—today and tomorrow.





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THE COVER

The tomb of a noble Scythian couple in the Russian Republic of Tuva yielded this stag—part of a man's headpiece—and a hoard of other gold treasures.

BY SISSE BRIMBERG

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MAYNARD OWEN WILLIAMS


The caption on the back of this photo from our archives is short and cold: "India. Watering a man without breaking caste rules." For an Untouchable, a member of the lowest Hindu social class, the rules are many, with prohibitions on everything from physical contact with higher castes to drinking from central village wells.

Some pictures are painful to see. This one conjures up especially uncomfortable memories for me. In parts of my home state of Texas, African Americans couldn't drink from the same water fountains I used as a child. But pictures can also break down walls. Images of prejudice helped fuel the civil rights movement in the U.S. After years of protest, Jim Crow laws were overturned.

Three decades after this photo was taken, the 1950 constitution of newly independent India officially abolished Untouchability. Problem solved? Not exactly. Beatings and lynchings of Untouchables continue to this day, while police turn their backs. Many Indians deny that caste prejudice still exists, and many people in the rest of the world don't know it existed in the first place. No matter where you live, I ask you to turn to page 2. The time has come for the denial and ignorance to end.

Bill Allen

■ Watch my preview of the July issue on **National Geographic Today** on June 17 at 7 p.m. and again at 10 p.m. (ET and PT) on the National Geographic Channel.



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INDICATIONS AND USAGE

Seasonal Allergic Rhinitis

ALLEGRA is indicated for the relief of symptoms associated with seasonal allergic rhinitis in adults and children 6 years of age and older. Symptoms treated effectively were sneezing, rhinorrhea, itchy nose/palate/throat, itchy/watery/red eyes.

Chronic Idiopathic Urticaria

ALLEGRA is indicated for treatment of uncomplicated skin manifestations of chronic idiopathic urticaria in adults and children 6 years of age and older. It significantly reduces pruritus and the number of wheals.

CONTRAINDICATIONS

ALLEGRA is contraindicated in patients with known hypersensitivity to any of its ingredients.

PRECAUTIONS

Drug Interaction with Erythromycin and Ketoconazole

Fexofenadine hydrochloride has been shown to exhibit minimal (i.e., 5%) metabolism. However, co-administration of fexofenadine hydrochloride with ketoconazole and erythromycin led to increased plasma levels of fexofenadine hydrochloride. Fexofenadine hydrochloride had no effect on the pharmacokinetics of erythromycin and ketoconazole. In two separate studies, fexofenadine hydrochloride 120 mg twice daily (two times the recommended twice daily dose) was co-administered with erythromycin 500 mg every 8 hours or ketoconazole 400 mg once daily under steady state conditions to normal, healthy volunteers (n=24, each study). No differences in adverse events or QT_c interval were observed when patients were administered fexofenadine hydrochloride alone or in combination with erythromycin or ketoconazole. The findings of these studies are summarized in the following table:

Effects on steady-state fexofenadine hydrochloride pharmacokinetics after 7 days of co-administration with fexofenadine hydrochloride 120 mg every 12 hours (two times the recommended twice daily dose) in normal volunteers (n=24)

Concomitant Drug	C _{max} (Peak plasma concentration)	AUC _{0-12h} (Extent of systemic exposure)
Erythromycin (500 mg every 8 hrs)	+8.2%	+109%
Ketoconazole (400 mg once daily)	+135%	+164%

The changes in plasma levels were within the range of plasma levels achieved in adequate and well-controlled clinical trials.

The mechanism of these interactions has been evaluated in *in vitro*, *in situ*, and *in vivo* animal models. These studies indicate that ketoconazole or erythromycin co-administration enhances fexofenadine gastrointestinal absorption. *In vivo* animal studies also suggest that in addition to increasing absorption, ketoconazole decreases fexofenadine hydrochloride gastrointestinal secretion, while erythromycin may also decrease biliary excretion.

Drug Interactions with Antacids

Administration of 120 mg of fexofenadine hydrochloride (2 x 60 mg capsule) within 15 minutes of an aluminum and magnesium containing antacid (MaaLox®) decreased fexofenadine AUC by 41% and C_{max} by 43%. ALLEGRA should not be taken closely in time with aluminum and magnesium containing antacids.

Carcinogenesis, Mutagenesis, Impairment of Fertility

The carcinogenic potential and reproductive toxicity of fexofenadine hydrochloride were assessed using terfenadine studies with adequate fexofenadine hydrochloride exposure (based on plasma area-under-the-concentration vs. time [AUC] values). No evidence of carcinogenicity was observed in an 18-month study in mice and in a 24-month study in rats at oral doses up to 150 mg/kg of terfenadine (which led to fexofenadine exposures that were respectively approximately 3 and 5 times the exposure from the maximum recommended daily oral dose of fexofenadine hydrochloride in adults and children).

In vitro (Bacterial Reverse Mutation, CHO/HGPRT Forward Mutation, and Rat Lymphocyte Chromosomal Aberration assays) and *in vivo* (Mouse Bone Marrow Micronucleus assay) tests, fexofenadine hydrochloride revealed no evidence of mutagenicity.

In rat fertility studies, dose-related reductions in implants and increases in postimplantation losses were observed at an oral dose of 150 mg/kg of terfenadine (which led to fexofenadine hydrochloride exposures that were approximately 3 times the exposure of the maximum recommended daily oral dose of fexofenadine hydrochloride in adults).

Pregnancy

Teratogenic Effects: Category C. There was no evidence of teratogenicity in rats or rabbits at oral doses of terfenadine up to 300 mg/kg (which led to fexofenadine exposures that were approximately 4 and 31 times, respectively, the exposure from the maximum recommended daily oral dose of fexofenadine in adults).

There are no adequate and well-controlled studies in pregnant women. Fexofenadine should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Nonteratogenic Effects. Dose-related decreases in pup weight gain and survival were observed in rats exposed to an oral dose of 150 mg/kg of terfenadine (approximately 3 times the maximum recommended daily oral dose of fexofenadine hydrochloride in adults based on comparison of fexofenadine hydrochloride AUCs).

Nursing Mothers

There are no adequate and well-controlled studies in women during lactation. Because many drugs are excreted in human milk, caution should be exercised when fexofenadine hydrochloride is administered to a nursing woman.

Pediatric Use

The recommended dose in patients 6 to 11 years of age is based on cross-study comparison of the pharmacokinetics of ALLEGRA in adults and pediatric patients and on the safety profile of fexofenadine hydrochloride in both adult and pediatric patients at doses equal to or higher than the recommended doses.

The safety of ALLEGRA tablets at a dose of 30 mg twice daily has been demonstrated in 438 pediatric patients 6 to 11 years of age in two placebo-controlled 2-week seasonal allergic rhinitis trials. The safety of ALLEGRA for the treatment of chronic idiopathic urticaria in patients 6 to 11 years of age is based on cross-study comparison of the pharmacokinetics of ALLEGRA in adult and pediatric patients and on the safety profile of fexofenadine in both adult and pediatric patients at doses equal to or higher than the recommended dose.

The effectiveness of ALLEGRA for the treatment of seasonal allergic rhinitis in patients 6 to 11 years of age was demonstrated in one trial (n=111) in which ALLEGRA tablets 30 mg twice daily significantly reduced total symptom scores compared to placebo, along with extrapolation of demonstrated efficacy in patients ages 12 years and older, and the pharmacokinetic comparisons in adults and children. The effectiveness of ALLEGRA for the treatment of chronic idiopathic urticaria in patients 6 to 11 years of age is based on an extrapolation of the demonstrated efficacy of ALLEGRA in adults with this condition and the likelihood that the disease course, pathophysiology and the drug's effect are substantially similar in children to that of adult patients.

The safety and effectiveness of ALLEGRA in pediatric patients under 6 years of age have not been established.

Geriatric Use

Clinical studies of ALLEGRA tablets and capsules did not include sufficient numbers of subjects aged 65 years and over to determine whether this population responds differently from younger patients. Other reported clinical experience has not identified differences in responses between the geriatric and younger patients. This drug is known to be substantially excreted by the kidney, and the risk of toxic reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection, and may be useful to monitor renal function. (See CLINICAL PHARMACOLOGY).

ADVERSE REACTIONS

Seasonal Allergic Rhinitis

Adults. In placebo-controlled seasonal allergic rhinitis clinical trials in patients 12 years of age and older, which included 2461 patients receiving fexofenadine hydrochloride capsules at doses of 20 mg to 240 mg twice daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. All adverse events that were reported by greater than 1% of patients who received the recommended daily dose of fexofenadine hydrochloride (60 mg capsules twice daily), and that were more common with fexofenadine hydrochloride than placebo, are listed in Table 1.

In a placebo-controlled clinical study in the United States, which included 570 patients aged 12 years and older receiving fexofenadine hydrochloride tablets at doses of 120 or 180 mg once daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. Table 1 also lists adverse experiences that were reported by greater than 2% of patients treated with fexofenadine hydrochloride tablets at doses of 180 mg once daily and that were more common with fexofenadine hydrochloride than placebo.

The incidence of adverse events, including drowsiness, was not dose-related and was similar across subgroups defined by age, gender, and race.

Table 1
Adverse experiences in patients ages 12 years and older reported in placebo-controlled seasonal allergic rhinitis clinical trials in the United States
Twice daily dosing with fexofenadine capsules at rates of greater than 1%

Adverse experience	Fexofenadine 60 mg Twice Daily (n=679)	Placebo Twice Daily (n=671)
Viral infection (cold, flu)	2.5%	1.5%
Nausea	1.6%	1.5%
Dysmenorrhea	1.5%	0.3%
Drowsiness	1.3%	0.9%
Dyspepsia	1.3%	0.6%
Fatigue	1.3%	0.9%

Once daily dosing with fexofenadine hydrochloride tablets at rates of greater than 2%

Adverse experience	Fexofenadine 180 mg once daily (n=283)	Placebo (n=293)
Headache	10.6%	7.5%
Upper Respiratory Tract Infection	3.2%	3.1%
Back Pain	2.8%	1.4%

The frequency and magnitude of laboratory abnormalities were similar in fexofenadine hydrochloride and placebo-treated patients.

Pediatric. Table 2 lists adverse experiences in patients aged 6 to 11 years of age which were reported by greater than 2% of patients treated with fexofenadine hydrochloride tablets at a dose of 30 mg twice daily in placebo-controlled seasonal allergic rhinitis studies in the United States and Canada that were more common with fexofenadine hydrochloride than placebo.

Table 2
Adverse experiences reported in placebo-controlled seasonal allergic rhinitis studies in pediatric patients ages 6 to 11 in the United States and Canada at rates of greater than 2%

Adverse experience	Fexofenadine 30 mg twice daily (n=209)	Placebo (n=229)
Headache	7.2%	6.0%
Accidental injury	2.9%	1.3%
Coughing	3.8%	1.3%
Fever	2.4%	0.9%
Pain	2.4%	0.4%
Otitis Media	2.4%	0.0%
Upper Respiratory Tract Infection	4.3%	1.7%

Chronic Idiopathic Urticaria

Adverse events reported by patients 12 years of age and older in placebo-controlled chronic idiopathic urticaria studies were similar to those reported in placebo-controlled seasonal allergic rhinitis studies. In placebo-controlled chronic idiopathic urticaria clinical trials, which included 726 patients 12 years of age and older receiving fexofenadine hydrochloride tablets at doses of 20 to 240 mg twice daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. Table 3 lists adverse experiences in patients aged 12 years and older which were reported by greater than 2% of patients treated with fexofenadine hydrochloride 60 mg tablets twice daily in controlled clinical studies in the United States and Canada and that were more common with fexofenadine hydrochloride than placebo. The safety of fexofenadine hydrochloride in the treatment of chronic idiopathic urticaria in pediatric patients 6 to 11 years of age is based on the safety profile of fexofenadine hydrochloride in adults and adolescent patients at doses equal to or higher than the recommended dose (see Pediatric Use).

Table 3
Adverse experiences reported in patients 12 years and older in placebo-controlled chronic idiopathic urticaria studies in the United States and Canada at rates of greater than 2%

Adverse experience	Fexofenadine 60 mg twice daily (n=186)	Placebo (n=178)
Back Pain	2.2%	1.1%
Sinusitis	2.2%	1.1%
Dizziness	2.2%	0.6%
Drowsiness	2.2%	0.0%

Events that have been reported during controlled clinical trials involving seasonal allergic rhinitis and chronic idiopathic urticaria patients with incidences less than 1% and similar to placebo and have been rarely reported during postmarketing surveillance include: insomnia, nervousness, and sleep disorders or paranoia. In rare cases, rash, urticaria, pruritus and hypersensitivity reactions with manifestations such as angioedema, chest tightness, dyspnea, flushing and systemic anaphylaxis have been reported.

OVERDOSAGE

Reports of fexofenadine hydrochloride overdose have been infrequent and contain limited information. However, dizziness, drowsiness, and dry mouth have been reported. Single doses of fexofenadine hydrochloride up to 800 mg (six normal volunteers at this dose level), and doses up to 690 mg twice daily for 1 month (three normal volunteers at this dose level) or 240 mg once daily for 1 year (234 normal volunteers at this dose level) were administered without the development of clinically significant adverse events as compared to placebo.

In the event of overdose, consider standard measures to remove any unabsorbed drug. Symptomatic and supportive treatment is recommended. Hemodialysis did not effectively remove fexofenadine hydrochloride from blood (1.7% removed) following terfenadine administration.

No deaths occurred at oral doses of fexofenadine hydrochloride up to 5000 mg/kg in mice (110 times the maximum recommended daily oral dose in adults and 200 times the maximum recommended daily oral dose in children based on mg/m²) and up to 5000 mg/kg in rats (230 times the maximum recommended daily oral dose in adults and 400 times the maximum recommended daily oral dose in children based on mg/m²). Additionally, no clinical signs of toxicity or gross pathological findings were observed. In dogs, no evidence of toxicity was observed at oral doses up to 2000 mg/kg (300 times the maximum recommended daily oral dose in adults and 530 times the maximum recommended daily oral dose in children based on mg/m²).

DOSAGE AND ADMINISTRATION

Seasonal Allergic Rhinitis

Adults and Children 12 Years and Older. The recommended dose of ALLEGRA is 60 mg twice daily, or 180 mg once daily. A dose of 60 mg once daily is recommended as the starting dose in patients with decreased renal function (see CLINICAL PHARMACOLOGY).

Children 6 to 11 Years. The recommended dose of ALLEGRA is 30 mg twice daily. A dose of 30 mg once daily is recommended as the starting dose in pediatric patients with decreased renal function (see CLINICAL PHARMACOLOGY).

Chronic Idiopathic Urticaria

Adults and Children 12 Years and Older. The recommended dose of ALLEGRA is 60 mg twice daily. A dose of 60 mg once daily is recommended as the starting dose in patients with decreased renal function (see CLINICAL PHARMACOLOGY).

Children 6 to 11 Years. The recommended dose of ALLEGRA is 30 mg twice daily. A dose of 30 mg once daily is recommended as the starting dose in pediatric patients with decreased renal function (see CLINICAL PHARMACOLOGY).

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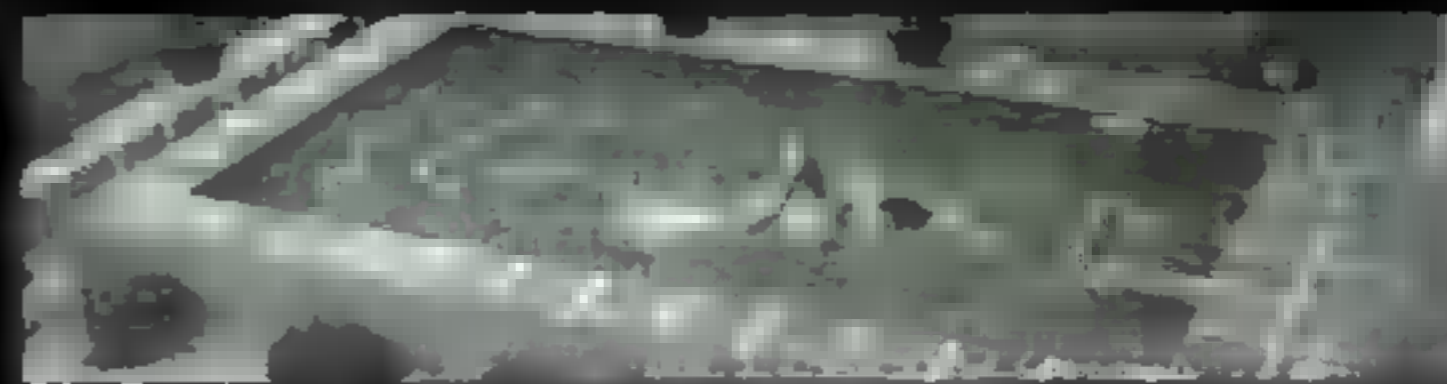
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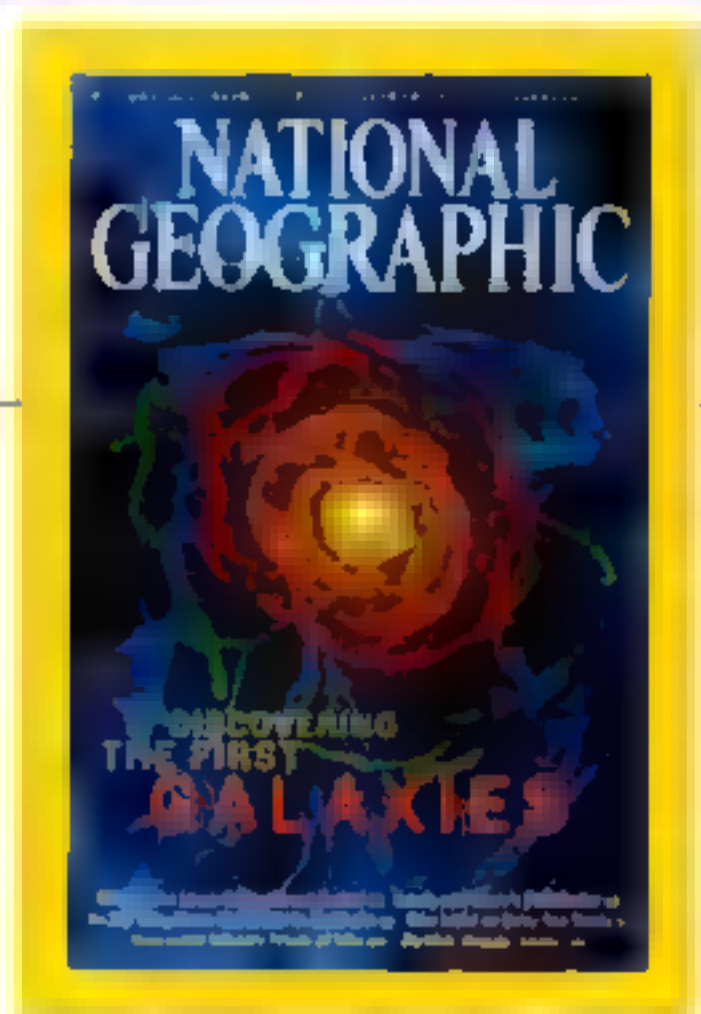
THOMAS JEFFERSON and SALLY HEMINGS

Vernon Jordan gets caught reading.

Forum

February 2003

Shocking images of war in Sudan moved many readers to write in. But a shocking sight of a different kind, NATIONAL GEOGRAPHIC's newsstand-only swimsuit edition (see next page), generated one of the biggest piles of mail so far this year. Many objected to the cover. Others found the issue to be delightful. One woman even found her face staring back at her.



Shattered Sudan

Your article underscores the utter futility of war. The men are trotting around with machine guns, the children are suffering, the women are crying, and the pockets of a privileged few are getting filled. Randy Olson's picture of a young girl on pages 46-7 struck a chord with me: Half her face has a weary look; the other half is cast in shadow—much like her future. Being grateful when I lay my head down tonight seems hardly enough.

JODIE LYSTER
Richmond, Quebec

I would appreciate anyone's identifying one sovereign nation in Africa, the Middle East, or anywhere else where the fortune befallen it from being fortuitously underlain by vast pools of oil has resulted in democracy, freedom, and egalitarian prosperity for the peoples of the nation.

S. N. LUTTICH
Republic, Washington

It is currently in vogue to blame big oil for as many problems as possible. The real problem in Sudan is intolerance, not oil. People anywhere will fight over oil, diamonds, or anything else of value if they cannot agree or cooperate for their own good and the good of their country.

DONALD M. REIDEL
Sequim, Washington

We've had this war in our backyard for almost half a century. How many more lives will it cost us for the racists to understand that we're all one and deserve to live on the same land? How long will they use religion as an excuse to kill, rape, maim, and make hell on Earth? Are we waiting for the Sudanese government to acquire weapons of mass destruction before Sudan appears on the front page? What a shame for our generation. Cry, my beloved country, cry.

HOSEA JEMBA
Kampala, Uganda

FROM OUR ONLINE FORUM
nationalgeographic.com/ngm/0302

In any account of Sudan's plight, one must include the deaths that are a result of the American cruise missiles that shattered irreparably the productive capacity



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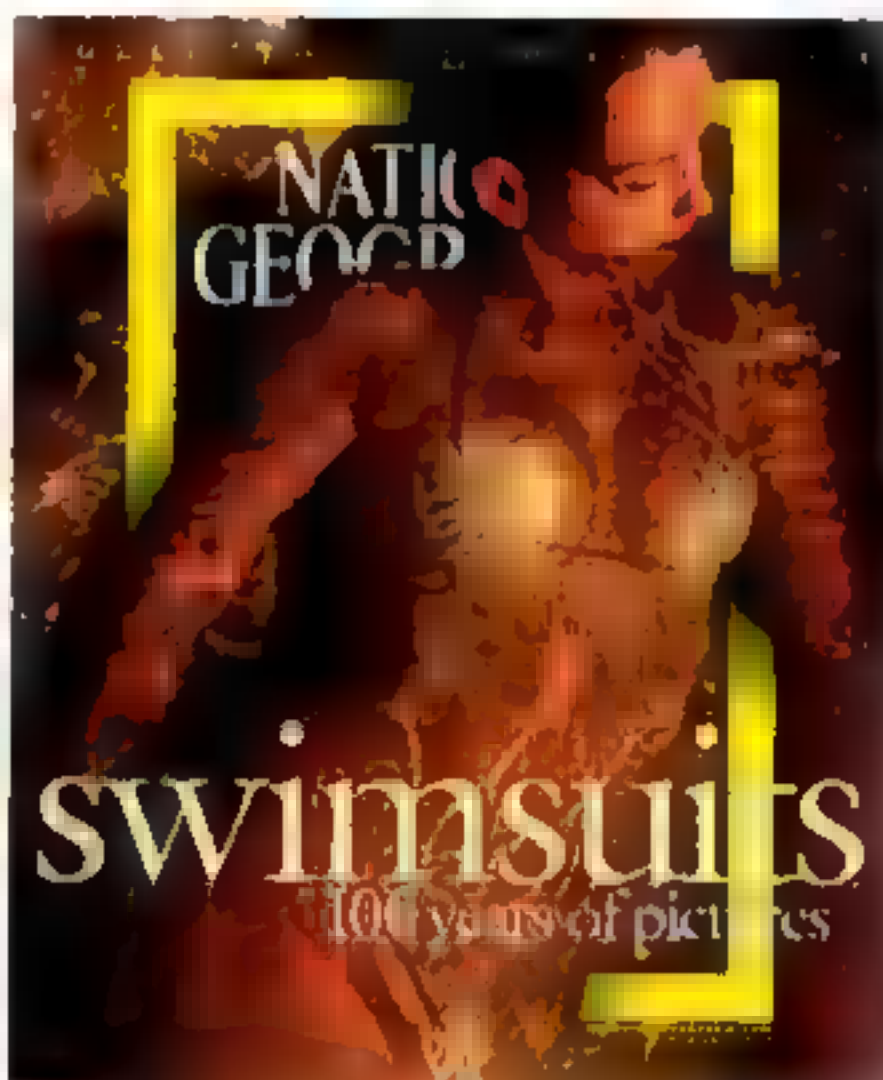


Swimsuit Special Issue

How disappointing to see your cover looking like every fashion, sports, and men's magazine on the rack. I disagree with your decision to succumb to the industry's lame logic that magazine sales increase only by publishing cover shots of young women in bikinis.

JOOLS BRANDT
Atlanta, Georgia

I wrote not too long ago about how upset I was that you were going to do a swimsuit edition. Recently I was at a bookstore and saw the edition. I opened it up and looked to see if my suspicions were confirmed and was shocked and delighted to see that you did not lower any of your standards. I have seen so much lately that is becoming crass and base; I assumed that you had decided to join



the slide. I must apologize. My faith has been restored!

JEAN R. TURNBULL
Clinton, Maryland

Swimsuits? *Et tu*, NATIONAL GEOGRAPHIC? Can't I go anywhere and not be reminded of my gender's second-class stature as an object? Two wrongs don't make a right, but if men were shown in the

same revealing way, or if there was a male swimsuit issue, then there would at least be equality of exploitation!

ELIZABETH A. KELLEY
Warwick, Rhode Island

What a surprise to find my picture in this elegant special issue. I'm one of the two young people holding up starfish on pages 40-41. The image had been in a September 1940 article on the Virgin Islands. Now my husband opens conversations with a question: "Have you seen my wife in the centerfold of the swimsuit issue?" I was 14 then, and my damp hair darkened in the picture. Today I'm a pure arctic blonde far from the ocean. Darn. Thank you for all the fun and joy you've heaped on us.

ANNA HOLCOMB YORK MULKEY
Albuquerque, New Mexico

of the al-Shifa pharmaceutical plant on August 20, 1998. This plant was responsible for fully half the medicinal drugs made in Sudan. No traces of chemical weapons or their constituent chemicals have ever been found on the site. Your article refers in passing to the destruction as "retaliation for al Qaeda's terrorist bombings." This half-hearted attempt to explain the attack rings hollow since Sudan's own effort to have the United Nations investigate the plant site was blocked by the American

WRITE TO FORUM

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delegation. The author refers to the danger of disease but fails to reflect on the indisputable reason that preventable diseases such as tuberculosis are raging.

DEREK COPP
Fuji, Japan

I just returned from several months as a cease-fire monitor with the Joint Military Commission in the Nuba Mountains, where I served with an officer from the government and an officer from the Sudan People's Liberation Army. I am in no way defending the actions of the government. In the same respect, the SPLA does not always place the welfare of people ahead of its policies. I witnessed brutality and murder on the part of the SPLA that is rarely reported in the Western press. Your recent accounts from the region are

superb and accurate, yet they are only a portion of the picture.

CHRISTOPHER VARHOLA
Kuwait City, Kuwait

FROM OUR ONLINE FORUM
nationalgeographic.com/ngm/0302

Perhaps the Dinka people eating leaves on pages 56-7 will find the "grilled tuna or salmon, delicately basted in a savory broth"—the cat food advertised on the inside back cover—before they starve to death. The contrast may say more about our society to future anthropologists than anything else you could have published.

DEAN C. BRUCKNER
Amundale, Virginia

Galaxy Hunters

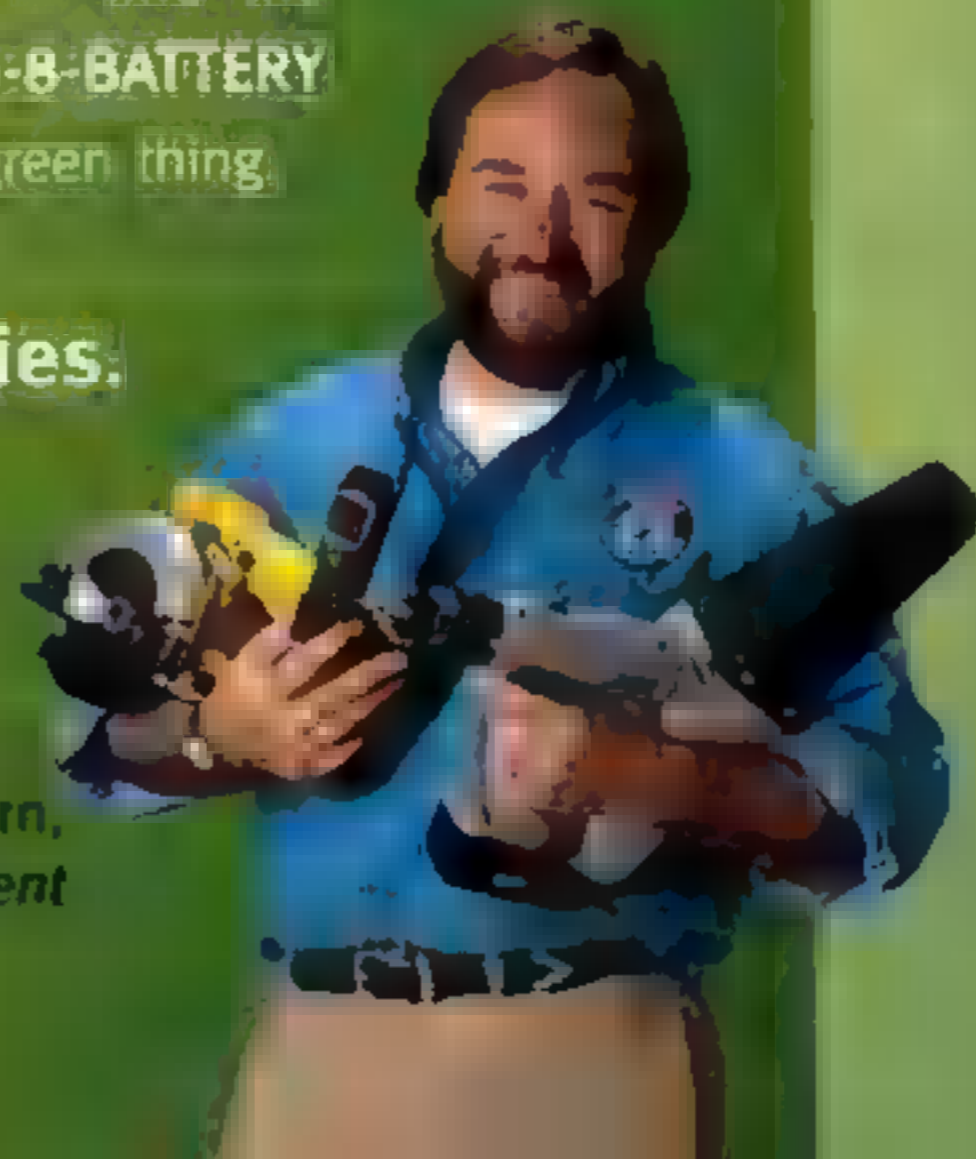
Within a few hours of my February issue arriving, the news of the *Columbia* disaster came—a sobering reminder of the high

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RBRC Spokesperson Richard Karn,
"Al" from TV's *Home Improvement*



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price to be paid for pushing back the frontiers of knowledge that ultimately allows articles like this to be written. For the families of the crew I doubt if there are any words of consolation. However, it might help them to know that those of us who care passionately about space exploration, and believe that it represents the very best endeavors and highest ideals of mankind, will never forget them.

NICK BLOOMFIELD
Milton Keynes, England

Because the universe has been expanding since the big bang, every galaxy should be getting farther away from every other galaxy. They should be traveling radially outward from the point where the big bang occurred.

How is it possible, then, that galaxies collide?

OLE WIK
Potter Valley, California

On a large scale, yes, galaxies are moving away from one another. On a local scale, however, the gravitational attraction of two galaxies can overcome expansion and lead to their collision.

Sea Vents

Numerous times in the article the intensity and power of the lighting was mentioned, but the article failed to mention the damaging effects that such strong lights have on deep-sea organisms, which are completely unadapted to light of any kind. I remember coming across references to scientific studies that said that

the lights used on scientific submersibles have blinded and otherwise irreversibly harmed the very organisms that were being so earnestly studied.

MAITHILEE KUNDA
Cambridge, Massachusetts

There is evidence suggesting that floodlights may damage the photosensitive cells on the backs of vent shrimp. The cells are thought to detect the dim light emitted by the superheated water around black smokers. There appears to be no effect, however, on their behavior, growth, or survival rate.

Sacagawea

The whale that Clark observed in January 1806 on the coast of Oregon, near present-day Cannon Beach, is the first stranded



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blue whale recorded in North America. Tillamook Indians had butchered the whale by the time Clark and others arrived. They did not report the remains as a blue whale. However, the pioneer naturalist measured the carcass and recorded its total length as 105 feet—sufficient evidence to classify the whale as a blue.

ROBERT L. BROWNELL, JR.
*National Marine Fisheries Service
Pacific Grove, California*

Bloodletting was not the only remedy that the captains used to save Sacagawea from her life-threatening illness. They administered laudanum, which most likely relieved her pain. They also allowed her to drink water from the sulfur springs across the river. Lewis reasoned that it might

have iron in it to replace some of the iron lost in bloodletting. At the very least it would have aided in rehydrating her. I mention this because not all early 19th-century medicine was detrimental.

JANICE FORGIE
Deltona, Florida

Pacific Suite

Douglas Chadwick wonders how long lisaak Forest Resources can continue its “extraselective” logging. The answer depends on consumers. lisaak’s operations in Clayoquot are certified by the Rainforest Alliance’s SmartWood sustainable forestry program and comply with a strict set of guidelines. Independent certifications like ours, accredited by the Forest Stewardship Council (FSC), guarantee consumers that the

wood products they purchase come from forests managed to conserve flora and fauna and support local communities. SmartWood has certified more than 17 million acres of forests and tree plantations globally. If consumers demand products bearing the SmartWood and FSC seals of approval, progressive companies like lisaak will provide them. And treasures like Clayoquot will continue to provide beauty, biodiversity, and boosts to the local economy.

TENSIE WHELAN
*Executive Director, Rainforest Alliance
New York, New York*

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GEOGRAPHY

THE PEOPLE, PLACES, AND PLANETS

CONSERVATION

Big Frog—Really Big

But vulnerable to deforestation, pollution, cook pots

It's foot dwarfs a man's palm, it's as heavy as a house cat, and, for those who've had reason to hold one, it feels like a balloon stuffed with wet sand. The goliath frog, *Conraua goliath*, lives exclusively along isolated rivers in the rain forests of Cameroon and Equatorial Guinea, where it's embedded in local folklore (Mbo tribesmen believe the frogs are wizards of sacred waterfalls). But its habitat—forests boasting the most amphibian species in West Africa—is rapidly disappearing, threatening to take the world's largest frog with it.

It's not easy being big. At 4 foot long and seven pounds in weight, goliaths are the offensive linemen of the amphibian world—slow, steady, but weary after a few hops. Their size intrigued collectors and zoos a decade ago: Many frogs were snatched up and exported to the U.S. for jumping contests (a short-lived fad) and captive breeding (a flop).

But these days the chief threats to the goliath are on the horizon. Commercial logging has decimated areas where they once took refuge. About half

APHICA

CULTURES OF OUR UNIVERSE





GENEVIEVE RENSON (BOTH)

their original habitat is lost or seriously damaged," says Chris Wild of the San Diego Zoo's Center for Reproduction of Endangered Species (CRES).

Meanwhile, agrochemicals used illegally in fishing are turning rivers toxic. This could be disastrous for an animal that relies on ten central African river systems—for hunting in rapids, cooling off in waterfalls, and spawning in rocky pools.

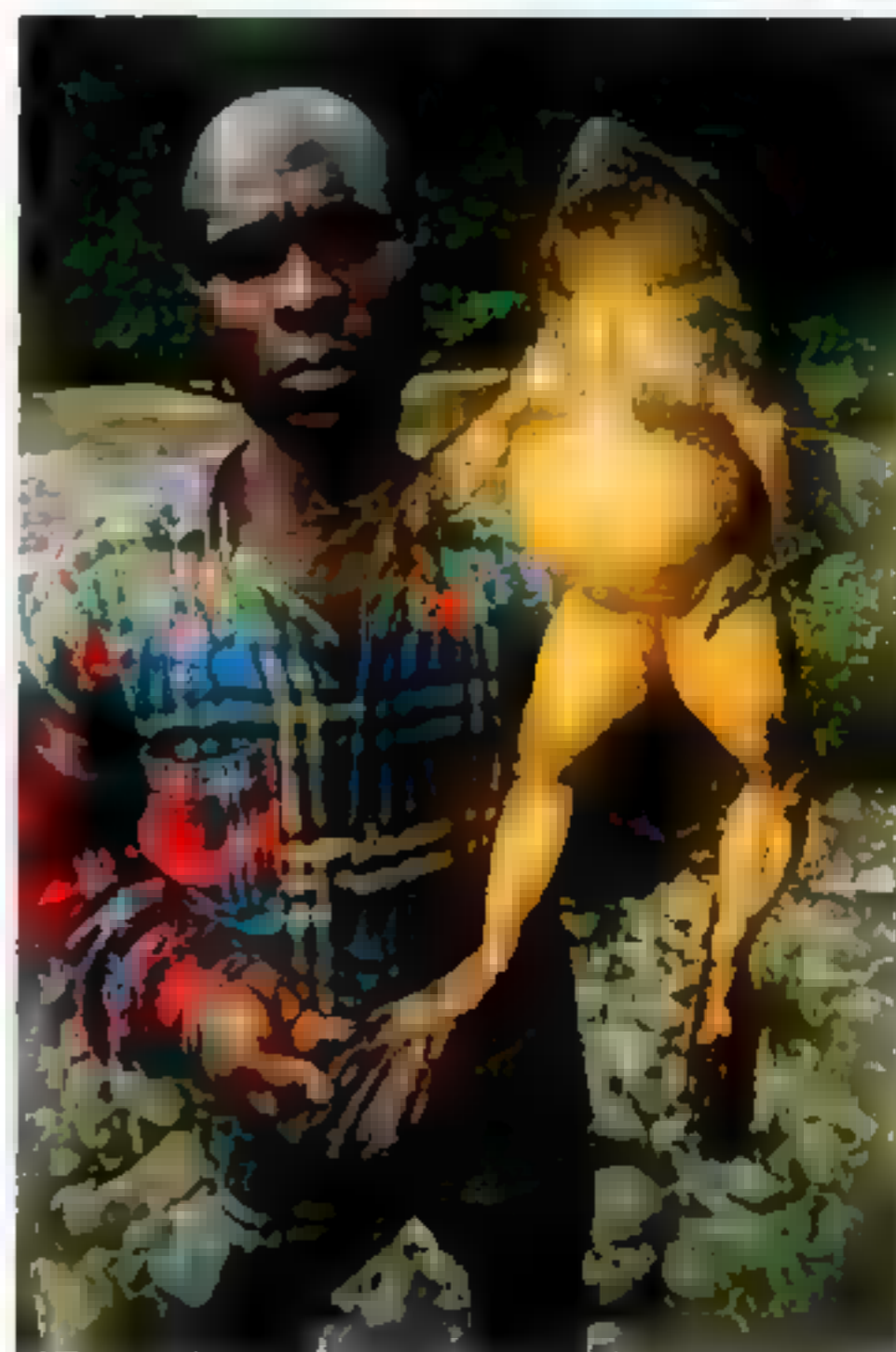
Finally, more frogs are being caught and sold for food as hunters gain access to logged wilderness. "At local markets sometimes 70 frogs can be seen at a time," says Wild. "They're considered pure, associated with clean-water spirits and good for pregnant women. And they taste sweet too." Local restaurateurs pay about five dollars apiece for a big one (right, with its captor).

CRES and the World Wide Fund for Nature, with Cameroon's Department of Wildlife and Protected Areas, are trying to preserve frog habitat, which is shrinking by more than 200,000 acres a year. Earlier this year

three wildlife sanctuaries in Littoral Province were approved, and a river management plan may follow. If properly enforced, protective laws can make a dent. Still, says Wild, the root cause of the destruction—commercial logging fueled by consumer demand—is not easily stemmed.

When GEOGRAPHIC last reported on goliaths, in July 1967, Paul Zahl described an uninviting habitat and limited hunting. "Unless these factors change, their survival seems assured," he wrote then. No longer.

—Jennifer Steinberg Holland



IN/OUT

Mexico City's Bug Problem

For decades tens of thousands of Volkswagen Beetles (below right) have dominated Mexico City's taxi fleet. The bugs are cheap and can squeeze through tight spaces. But their air-cooled engines are big polluters, and without rear doors it's easy for a crooked cabbie to trap, then rob or kidnap passengers. Now authorities are offering incentives to dump Beetles for cleaner running and safer four-doors (below left). Within ten years a familiar icon may be phased out.



JESUS LOPEZ (BOTH)

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 where some people still find it hard

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 the injustices
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AUSTRALIA

Extended Apologies

Sorry Day, an unusual holiday of repentance

There's little dispute about what happened: From the early 1800s until the late 1970s white Australians abducted perhaps 50,000 Aboriginal children from their families, then placed them in orphanages and foster homes where they were "civilized"—a program sanctioned by the government in the name of nation building.

But there is a dispute over how to respond to this history. The 1997 government publication *Bringing Them Home*, which detailed the grim story of the so-called Stolen Generations, labeled the program "genocide" because it aimed to eliminate Aborigines as a distinct group.

Among the report's recommendations was the creation of a national Sorry Day, when individual Australians could ask their Aboriginal neighbors for forgiveness. For the past six years some Australians have observed Sorry Day on May 26 with lectures, poetry readings, art exhibits; they display bumper stickers (below) and sign communal Sorry Books (above).

Not everyone, though, wants to apologize. Prime Minister John Howard has refused to offer an official apology, partly because it would invite litigation and costly reparation payments. Some Australians see no reason to repent for the sins of others.

And conservative critics fear Australia's annual orgy of self-recrimination reflects a loss of faith in the nation—and in Western civilization. "There's a wide, irreconcilable gap between Aboriginal culture and modern life," maintains anthropologist Roger Sandall. "Sorry Day pretends otherwise." —Alan Mairson

A Short History of Regret

2002 Saddam Hussein apologizes for Iraq's 1990 invasion of Kuwait.

2000 Pope John Paul II asks forgiveness for the church's sins against various groups, including Jews, women, and the poor.

1997 President Bill Clinton apologizes for ■ U.S. government study that began in the 1930s and exposed 399 African-American men to syphilis without providing treatment.

1995 The Queen of England apologizes to New Zealand's native Maoris for a "wrongful and unjust" land grab in the 1860s.

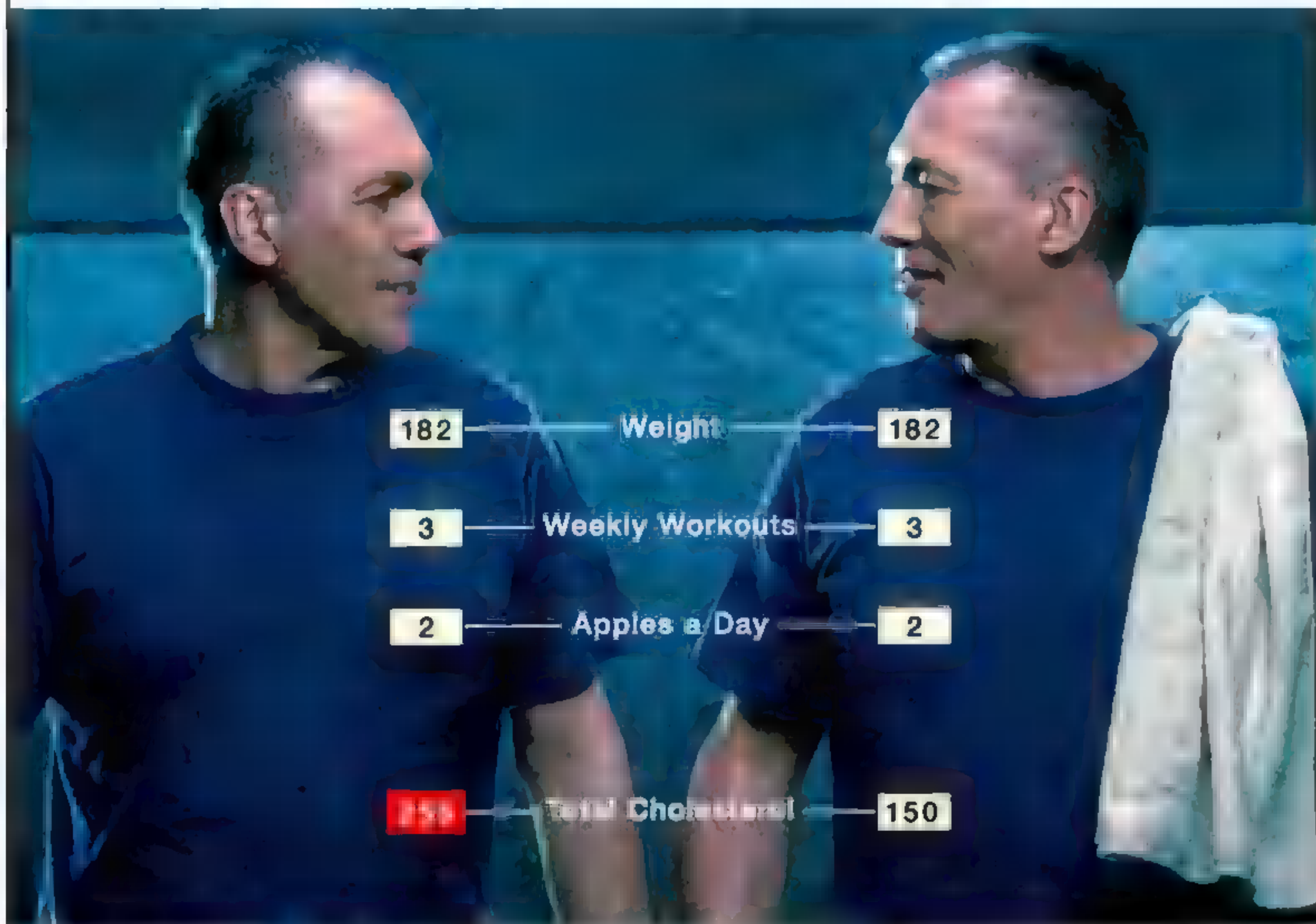
1995 The prime minister of Japan shares his "deep remorse" and a "heartfelt apology" to all victims of World War II.

1990 East Germany says it's sorry for the Holocaust.



JASON EDWARDS (BOTH)

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Please see additional important information on next page.

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CONTRAINDICATIONS: Active liver disease or unexplained persistent elevations of serum transaminases. Hypersensitivity to any component of this medication. **Pregnancy and Lactation** — Atherosclerosis is a chronic process and discontinuation of lipid-lowering drugs during pregnancy should have little impact on the outcome of long-term therapy of primary hypercholesterolemia. Cholesterol and other products of cholesterol biosynthesis are essential components for fetal development (including synthesis of steroids and cell membranes). Since HMG-CoA reductase inhibitors decrease cholesterol synthesis and possibly the synthesis of other biologically active substances derived from cholesterol, they may cause fetal harm when administered to pregnant women. Therefore, HMG-CoA reductase inhibitors are contraindicated during pregnancy and in nursing mothers. ATORVASTATIN SHOULD BE ADMINISTERED TO WOMEN OF CHILDBEARING AGE ONLY WHEN SUCH PATIENTS ARE HIGHLY UNLIKELY TO CONCEIVE AND HAVE BEEN INFORMED OF THE POTENTIAL HAZARDS. If the patient becomes pregnant while taking this drug, therapy should be discontinued and the patient apprised of the potential hazard to the fetus.

WARNINGS: Liver Dysfunction — HMG-CoA reductase inhibitors, like some other lipid-lowering therapies, have been associated with biochemical abnormalities of liver function. **Persistent elevations (>3 times the upper limit of normal [ULN]) occurring on 2 or more occasions in serum transaminases occurred in 0.7% of patients who received atorvastatin in clinical trials. The incidence of these abnormalities was 0.2%, 0.2%, 0.6%, and 2.3% for 10, 20, 40, and 80 mg, respectively. One patient in clinical trials developed jaundice. Increases in liver function tests (LFT) in other patients were not associated with jaundice or other clinical signs or symptoms. Upon dose reduction, drug interruption, or discontinuation, transaminase levels returned to or near pretreatment levels without sequelae. Eighteen of 30 patients with persistent LFT elevations continued treatment with a reduced dose of atorvastatin. It is recommended that liver function tests be performed prior to and at 12 weeks following both the initiation of therapy and any elevation of dose, and periodically (eg, semiannually) thereafter. Liver enzyme changes generally occur in the first 3 months of treatment with atorvastatin. Patients who develop increased transaminase levels should be monitored until the abnormalities resolve. Should an increase in ALT or AST of >3 times ULN persist, reduction of dose or withdrawal of atorvastatin is recommended. Atorvastatin should be used with caution in patients who consume substantial quantities of alcohol and/or have a history of liver disease. Active liver disease or unexplained persistent transaminase elevations are contraindications to the use of atorvastatin (see CONTRAINDICATIONS). **Skeletal Muscle** — Rare cases of rhabdomyolysis with acute renal failure secondary to myoglobinuria have been reported with atorvastatin and with other drugs in this class. Uncomplicated myalgia has been reported in atorvastatin-treated patients (see ADVERSE REACTIONS). Myopathy, defined as muscle aches or muscle weakness in conjunction with increases in creatine phosphokinase (CPK) values >10 times ULN, should be considered in any patient with diffuse myalgias, muscle tenderness or weakness, and/or marked elevation of CPK. Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever. Atorvastatin therapy should be discontinued if markedly elevated CPK levels occur or myopathy is diagnosed or suspected. The risk of myopathy during treatment with drugs in this class is increased with concurrent administration of cyclosporine, fibric acid derivatives, erythromycin, niacin, or azole antifungals. Physicians considering combined therapy with atorvastatin and fibric acid derivatives, erythromycin, immunosuppressive drugs, azole antifungals, or lipid-lowering doses of niacin should carefully weigh the potential benefits and risks and should carefully monitor patients for any signs or symptoms of muscle pain, tenderness, or weakness, particularly during the initial months of therapy and during any periods of upward dosage titration of either drug. Periodic creatine phosphokinase (CPK) determinations may be considered in such situations, but there is no assurance that such monitoring will prevent the occurrence of severe myopathy. Atorvastatin therapy should be temporarily withheld or discontinued in any patient with an acute, serious condition suggestive of a myopathy or having a risk factor predisposing to the development of renal failure secondary to rhabdomyolysis (eg, severe acute infection, hypotension, major surgery, trauma, severe metabolic, endocrine and electrolyte disorders, and uncontrolled seizures).**

PRECAUTIONS: General — Before instituting therapy with atorvastatin, an attempt should be made to control hypercholesterolemia with appropriate diet, exercise, and weight reduction in obese patients, and to treat other underlying medical problems (see INDICATIONS AND USAGE in full prescribing information). **Information for Patients** — Patients should be advised to report promptly unexplained muscle pain, tenderness, or weakness, particularly if accompanied by malaise or fever. **Drug Interactions** — The risk of myopathy during treatment with drugs of this class is increased with concurrent administration of cyclosporine, fibric acid derivatives, niacin (nicotinic acid), erythromycin, azole antifungals (see WARNINGS, Skeletal Muscle). **Antacid** — When atorvastatin and Melecta[®] TC suspension were coadministered, plasma concentrations of atorvastatin decreased approximately 35%. However, LDL-C reduction was not altered. **Antipyretic** — Because atorvastatin does not affect the pharmacokinetics of aspirin, interactions with other drugs metabolized via the same cytochrome isozymes are not expected. **Colistepol** — Plasma concentrations of atorvastatin decreased approximately 25% when colistepol and atorvastatin were coadministered. However, LDL-C reduction was greater when atorvastatin and colistepol were coadministered than when either drug was given alone. **Cimetidine** — Atorvastatin plasma concentrations and LDL-C reduction were not altered by coadministration of cimetidine. **Digoxin** — When multiple doses of atorvastatin and digoxin were coadministered, steady-state plasma digoxin concentrations increased by approximately 20%. Patients taking digoxin should be monitored appropriately. **Erythromycin** — In healthy individuals, plasma concentrations of atorvastatin increased approximately 40% with coadministration of atorvastatin and erythromycin, a known inhibitor of cytochrome P450 3A4 (see WARNINGS, Skeletal Muscle). **Oral Contraceptives** — Coadministration of atorvastatin and an oral contraceptive increased AUC values for norethindrone and ethinyl estradiol by approximately 30% and 20%. These increases should be considered when selecting an oral contraceptive for a woman taking atorvastatin. **Warfarin** — Atorvastatin had no clinically significant effect on prothrombin time when administered to patients receiving chronic warfarin treatment. **Endocrine Function** — HMG-CoA reductase inhibitors interfere with cholesterol synthesis and theoretically might blunt adrenal and/or gonadal steroid production. Clinical studies have shown that atorvastatin does not reduce basal plasma cortisol concentration or impair adrenal reserve. The effects of HMG-CoA reductase inhibitors on male fertility have not been studied in adequate numbers of patients. The effects, if any, on the pituitary-gonadal axis in premenopausal women are unknown. Caution should be exercised if an HMG-CoA reductase inhibitor is administered concomitantly with drugs that may decrease the levels or activity of endogenous steroid hormones, such as ketoconazole, spirogonolone, and cimetidine. **CNS Toxicity** — Brain hemorrhage was seen in a female dog treated for 3 months at 120 mg/kg/day. Brain hemorrhage and optic nerve vacuolation were seen in another female dog that was sacrificed in moribund condition after 11 weeks of escalating doses up to 280 mg/kg/day. The 120 mg/kg dose resulted in a systemic exposure approximately 16 times the human plasma area under the curve (AUC, 0-24 hours) based on the maximum human dose of 80 mg/day. A single tonic convulsion was seen in each of 2 male dogs (one treated at 10 mg/kg/day and one at 120 mg/kg/day) in a 2-year study. No CNS lesions have been observed in mice after chronic treatment for up to 2 years at doses up to 400 mg/kg/day or in rats at doses up to 100 mg/kg/day. These doses were 6 to 11 times (mouse) and 8 to 16 times (rat) the human AUC (0-24) based on the maximum recommended human dose of 80 mg/day. CNS vascular lesions, characterized by perivascular hemorrhages, edema, and mononuclear cell infiltration of perivascular spaces, have been observed in dogs treated with other members of this class. A chemically similar drug in this class produced optic nerve degeneration (Wallerian degeneration of retinogeniculate fibers) in clinically normal dogs in a dose-dependent fashion at a dose that produced plasma drug levels about 30 times higher than the mean drug level in humans taking the highest recommended dose. **Carcinogenesis, Mutagenesis, Impairment of Fertility** — In a 2-year carcinogenicity study in rats at dose levels of 10, 30, and 100 mg/kg/day, 2 rare tumors were found in muscle in high-dose females: in one, there was a rhabdomyosarcoma and, in another, there was a fibrosarcoma. This dose represents a plasma AUC (0-24) value of approximately 16 times the mean human plasma drug exposure after an 80 mg oral dose. A 2-year carcinogenicity study in mice given 100, 200, or 400 mg/kg/day resulted in a significant increase in liver adenomas in high-dose males and liver carcinomas in high-dose females. These findings occurred at plasma AUC (0-24) values of approximately 6 times the mean human plasma drug exposure after an 80 mg oral dose. *In vitro*, atorvastatin was not mutagenic or clastogenic in the following tests with and without metabolic activation: the Ames test with *Salmonella typhimurium* and *Escherichia coli*, the HGPRT forward mutation assay in Chinese hamster lung cells, and the chromosomal aberration assay in Chinese hamster lung cells. Atorvastatin was negative in the *in vivo* mouse micronucleus test. Studies in rats performed at doses up to 175 mg/kg (15 times the human exposure) produced no changes in fertility. There was aplasia and aspermia in the epididymis of 2 of 10 rats treated with 100 mg/kg/day of atorvastatin for 3 months (16 times the human AUC at the 80 mg dose); testis weights were significantly lower at 30 and 100 mg/kg and epididymal weight was lower at 100 mg/kg. Male rats given 100 mg/kg/day for 11 weeks prior to mating had decreased sperm motility, sperm head concentration, and increased abnormal sperm. Atorvastatin caused no adverse effects on semen parameters, or reproductive organ histopathology in dogs given doses of 10, 40, or 120 mg/kg for two years. **Pregnancy** — **Pregnancy Category X:** See CONTRAINDICATIONS. Safety in pregnant women has not been established.

Atorvastatin crosses the rat placenta and reaches a level in fetal liver equivalent to that of maternal plasma. Atorvastatin was not teratogenic in rats at doses up to 300 mg/kg/day or in rabbits at doses up to 100 mg/kg/day. These doses resulted in multiples of about 30 times (rat) or 20 times (rabbit) the human exposure based on surface area (mg/m²). In a study in rats given 20, 100, or 225 mg/kg/day, from gestation day 7 through to lactation day 21 (weaning), there was decreased pup survival at birth, neonate, weaning, and maturity in pups of mothers dosed with 225 mg/kg/day. Body weight was decreased on days 4 and 21 in pups of mothers dosed at 100 mg/kg/day; pup body weight was decreased at birth and at days 4, 21, and 91 at 225 mg/kg/day. Pup development was delayed (rotated performance at 100 mg/kg/day and acoustic startle at 225 mg/kg/day; pinnae detachment and eye opening at 225 mg/kg/day). These doses correspond to 6 times (100 mg/kg) and 22 times (225 mg/kg) the human AUC at 80 mg/day. Rare reports of congenital anomalies have been received following intrauterine exposure to HMG-CoA reductase inhibitors. There has been one report of severe congenital bony deformity, tracheo-esophageal fistula, and anal atresia (VATER association) in a baby born to a woman who took lovastatin with dextroamphetamine sulfate during the first trimester of pregnancy. LIPITOR should be administered to women of childbearing potential only when such patients are highly unlikely to conceive and have been informed of the potential hazards. If the woman becomes pregnant while taking LIPITOR, it should be discontinued and the patient advised again as to the potential hazards to the fetus. **Nursing Mothers** — Nursing rat pups had plasma and liver drug levels of 50% and 40%, respectively, of that in their mother's milk. Because of the potential for adverse reactions in nursing infants, women taking LIPITOR should not breastfeed (see CONTRAINDICATIONS). **Pediatric Use** — Treatment experience in a pediatric population is limited to doses of LIPITOR up to 80 mg/day for 1 year in 8 patients with homozygous FH. No clinical or biochemical abnormalities were reported in these patients. None of these patients was below 9 years of age. **Geriatric Use** — The safety and efficacy of atorvastatin (10-80 mg) in the geriatric population (≥65 years of age) was evaluated in the ACCESS study. In this 54-week open-label trial 1,958 patients initiated therapy with atorvastatin 10 mg. Of these, 835 were elderly (≥65 years) and 1,123 were non-elderly. The mean change in LDL-C from baseline after 6 weeks of treatment with atorvastatin 10 mg was -38.2% in the elderly patients versus -34.6% in the non-elderly group. The rates of discontinuation due to adverse events were similar between the two age groups. There were no differences in clinically relevant laboratory abnormalities between the age groups.

ADVERSE REACTIONS: LIPITOR is generally well tolerated. Adverse reactions have usually been mild and transient. In controlled clinical studies of 2502 patients, <2% of patients were discontinued due to adverse experiences attributable to atorvastatin. The most frequent adverse events thought to be related to atorvastatin were constipation, flatulence, dyspepsia, and abdominal pain. **Clinical Adverse Experiences** — Adverse experiences reported in ≥2% of patients in placebo-controlled clinical studies of atorvastatin, regardless of causality assessment, are shown in the following table.

BODY SYSTEM Adverse Event	Adverse Events in Placebo-Controlled Studies (% of Patients)				
	Placebo N = 270	Atorvastatin 10 mg N = 853	Atorvastatin 20 mg N = 36	Atorvastatin 40 mg N = 79	Atorvastatin 80 mg N = 94
BODY AS A WHOLE					
Infection	10.0	10.3	2.8	10.1	7.4
Headache	7.0	5.4	18.7	2.5	6.4
Accidental Injury	3.7	4.2	0.0	1.3	3.2
Flu Syndrome	1.9	2.2	0.0	2.5	3.2
Abdominal Pain	0.7	2.8	0.0	3.8	2.1
Back Pain	3.0	2.0	0.0	3.8	1.1
Allergic Reaction	2.8	0.9	2.8	1.3	0.0
Asthma	1.9	0.0	0.0	3.8	0.0
DIGESTIVE SYSTEM					
Constipation	1.8	2.1	0.0	2.5	1.1
Diarrhea	1.5	2.7	0.0	3.8	5.3
Dyspepsia	4.1	2.3	2.8	1.3	2.1
Flatulence	3.3	2.1	2.8	1.3	1.1
RESPIRATORY SYSTEM					
Sinusitis	2.6	2.8	0.0	2.5	6.4
Pharyngitis	1.5	2.5	0.0	1.3	2.1
SKIN AND APPENDAGES					
Rash	0.7	3.8	2.8	3.8	1.1
MUSCULOSKELETAL SYSTEM					
Arthralgia	1.5	2.0	0.0	5.1	0.0
Myalgia	1.1	3.2	5.6	1.3	0.0

The following adverse events were reported, regardless of causality assessment in patients treated with atorvastatin in clinical trials. The events in *italics* occurred in ≥2% of patients and the events in plain type occurred in <2% of patients.

Body as a Whole: Chest pain, face edema, fever, neck rigidity, malaise, photosensitivity reaction, generalized edema. **Digestive System:** Nausea, gastroenteritis, liver function tests abnormal, colitis, vomiting, gastritis, dry mouth, rectal hemorrhage, esophagitis, eructation, glossitis, mouth ulceration, anorexia, increased appetite, stomatitis, biliary pain, cholelithiasis, duodenal ulcer, dysphagia, enteritis, melena, gum hemorrhage, stomach ulcer, tenesmus, ulcerative stomatitis, hepatitis, pancreatitis, cholestatic jaundice. **Respiratory System:** Bronchitis, rhinitis, pneumonia, dyspnea, asthma, epistaxis. **Nervous System:** Insomnia, dizziness, paresthesia, somnolence, amnesia, abnormal dreams, libido decreased, emotional lability, incoordination, peripheral neuropathy, torticollis, facial paralysis, hyperkinesia, depression, hyposthesia, hyperkinesia. **Musculoskeletal System:** Arthritis, leg cramps, bursitis, tenosynovitis, myositis, tendon contracture, myositis. **Skin and Appendages:** Pruritus, contact dermatitis, alopecia, dry skin, sweating, acne, urticaria, eczema, seborrhea, skin ulcer. **Urogenital System:** Urinary tract infection, urinary frequency, cystitis, hematuria, impotence, dysuria, kidney calculus, nocturia, epididymitis, fibrocystic breast, vaginal hemorrhage, albuminuria, breast enlargement, metrorrhagia, nephritis, urinary incontinence, urinary retention, urinary urgency, abnormal ejaculation, uterine hemorrhage. **Special Senses:** Amblyopia, tonus, dry eyes, refraction disorder, eye hemorrhage, deafness, glaucoma, parosmia, taste loss, taste perversion. **Cardiovascular System:** Palpitation, vasodilatation, syncope, migraine, postural hypotension, phlebitis, arrhythmia, angina pectoris, hypertension. **Metabolic and Nutritional Disorders:** Peripheral edema, hyperglycemia, creatine phosphokinase increased, gout, weight gain, hypoglycemia. **Hemic and Lymphatic System:** Echinomiasis, anemia, lymphadenopathy, thrombocytopenia, petechia. **Postintroduction Reports** — Adverse events associated with LIPITOR therapy reported since market introduction, that are not listed above, regardless of causality assessment, include the following: anaphylaxis, angioneurotic edema, bullous rashes (including erythema multiforme, Stevens-Johnson syndrome, and toxic epidermal necrolysis), and rhabdomyolysis.

OVERDOSAGE: There is no specific treatment for atorvastatin overdose. In the event of an overdose, the patient should be treated symptomatically, and supportive measures instituted as required. Due to extensive drug binding to plasma proteins, hemodialysis is not expected to significantly enhance atorvastatin clearance.

Please see full prescribing information for more information about LIPITOR.

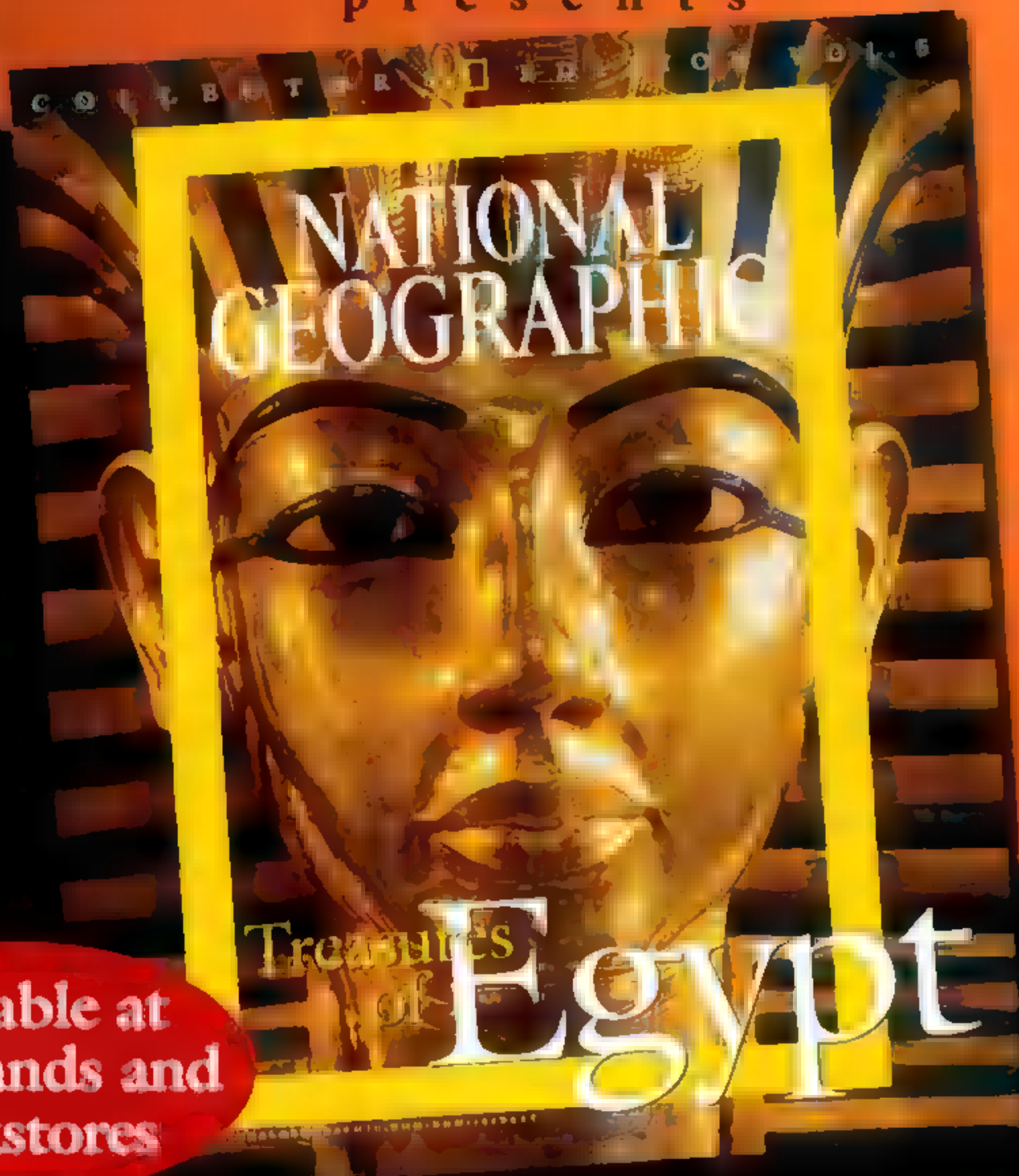
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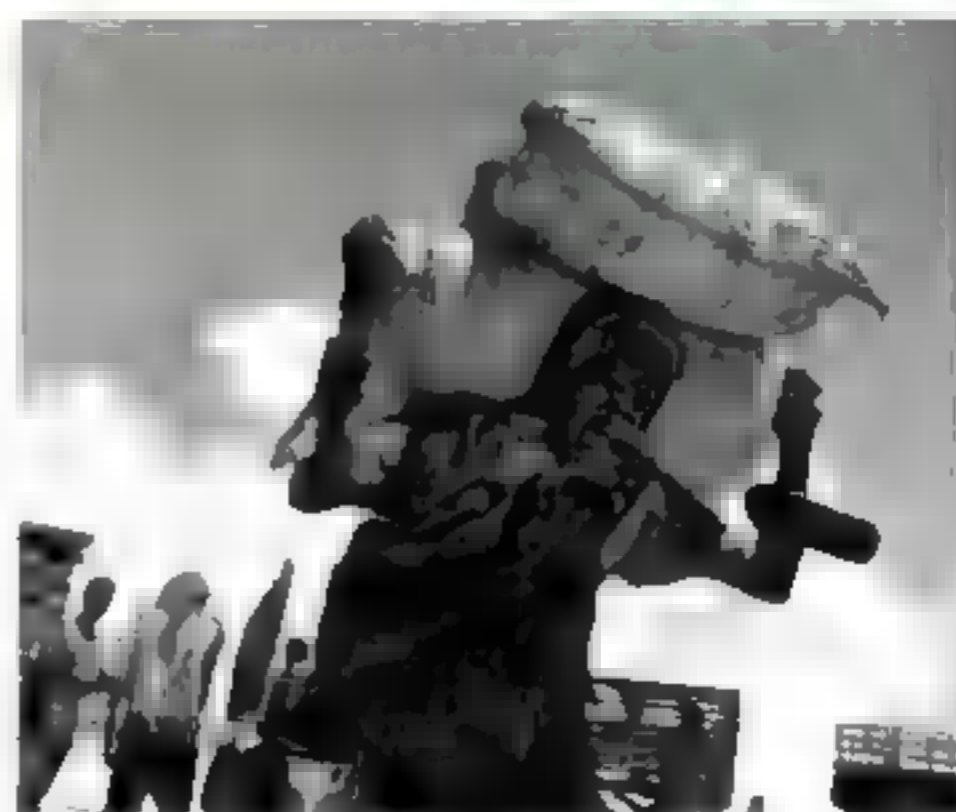
Somalia's forests are being burned to make charcoal

In Somalia they call it black gold, but it's not oil. Somalia's biggest export is charcoal, and the arid East African country is losing what little forest it has as desperate locals cut and burn acacia and other trees to create truckloads of the valuable fuel (above). Drought, inflation, 12 years of war, and an import ban by Persian Gulf states on Somali livestock suspected of carrying infectious Rift Valley fever have left farmers and herders with few means of survival other than charcoal. Sold to syndicates of warlords and wealthy businessmen, 80 percent

of the charcoal is shipped to the gulf, where its long burning capacity and low price make it much in demand.

Before the overthrow of Somalia's central government in 1991, an export ban on charcoal slowed shipments to the gulf. During the early part of the civil war that followed, powerful warlord Mohamed Farah Aideed continued to enforce the ban in areas under his control, but since his death in 1996 there's been no authority strong enough to stop the trade. Dealers evade bans imposed by weak governments that rule pieces of the country.

MONIQUE STAUFFER, ALMORA (BOTH)



In the north dealers smuggle charcoal across the border into Ethiopia. In the south it's trucked to ports such as Kismaayo for shipment to the gulf. The impact is widespread. Trees that once anchored the soil and kept it moist have been lost, and forests are giving way to desert and thorn brush—a devastating blow to wildlife and livestock alike.

—Karen E. Lange

CHEMICAL ECOLOGY

Eau de Giraffe

The stately giraffe hardly springs to mind as a beast with a body odor problem, but anyone who's whiffed one knows better. In 1924 a British game warden in Kenya claimed that he could smell giraffes 300 yards downwind. Now William Wood, a chemical ecologist at California's

Humboldt State University, knows why. He analyzed giraffe hair and found 11 chemical compounds, some quite malodorous (including two that give human feces its smell). Wood thinks they may repel ticks and fungus. What's more, nearly all the chemicals showed antibiotic properties. "Males, more pungent than females, may be advertising that they're healthy and desirable mates," Wood speculates. —John L. Eliot



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LIBRARY OF CONGRESS

Saving the World's Music

New book honors generations of "songcatchers"

Mountain Chief, a Black-foot Indian, joined folk song collector Frances Densmore (above) in listening to recordings of Native American music around 1916, early in Densmore's long career as a seeker of traditional—and often vanishing—forms of music.

Densmore and other collectors—from Cecil Sharp, who wandered Appalachia in search of "pure" English ballads, to composer Béla Bartók, a tireless field recorder of central Europe's folk music—come to life in *Songcatchers: In Search of the World's Music*, out this month from

National Geographic Books. It's written by Grateful Dead drummer Mickey Hart, who first fell under the spell of traditional music when he heard a recording of Pygmy songs as a boy. Hart himself has recorded the chants of Tibetan monks, the San Quentin prison choir, and Bedouin singers in the Sahara. *Songcatchers* is Hart's tribute to those who "travel to the remote corners of the Earth to make sure music is preserved."

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A Middle East Atlas, Just in Time

Talk about timely: The Society's new 96-page *Atlas of the Middle East* began appearing in bookstores in March, just as war broke out in Iraq (see page 52). The atlas focuses on 16 Middle East nations and the occupied territories of the West Bank



and the Gaza Strip.

Along with maps of each nation—some, like Bahrain, never mapped by the Society in such detail before—it includes maps of key cities and information on regional themes ranging from oil and water to religions and ethnic groups. You can also buy the atlas (\$19.95) at nationalgeographic.com/store; members can order a deluxe hardcover edition (\$24.95) at 1-888-647-6733.

CHECKING IN

... With a Honey of a Pair

When Rachel Anderson, then 13, was featured in a May 1993 *GEOGRAPHIC* article about her family's life as traveling beekeepers, a friend teased her: "Some guy will read this, come to work with you, and fall in love with you." Meanwhile, in Oklahoma, Melody Drake saw the story and pointed it out to her 13-year-old son, Richard, who was interested in bees and had been begging for a hive of his own. "Look," she told him, "these beekeepers have a daughter your age."

Sure enough, Rachel and Richard both ended up at Weimar College, a tiny Seventh-day Adventist school in California. She mentioned that she was a beekeeper's daughter—"It's a great conversation starter," she says. "Later his mother said to him, 'I bet she's that girl from the NATIONAL GEOGRAPHIC article.'" Rachel and Richard (below) began dating, and he eventually *did* work for her father, tending the family bees. Things took their natural course, and the two were married on April 8, 2001.



CATHERINE KARNOW

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To learn more about a subject covered in this issue, try these National Geographic Society products and services. Call 1-888-225-5647 or log on to nationalgeographic.com for more information.



PERU AND THE ANDES (PAGE 80)

- **Hidden Pyramids of Peru** on the National Geographic Channel, June 8, 8 p.m. ET/PT. Archaeologist Ruth Shady uncovers a city of lost pyramids in Peru's desolate coastal desert.
- **National Geographic Expedition to Peru**, September 20–October 1. Explore Machu Picchu, Andean villages, archaeological sites, and Lake Titicaca with author and adventurer Karin Muller. Call 1-888-966-8687.
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IMPORTANT INFORMATION ABOUT VIOXX.

People with allergic reactions, such as asthma, to aspirin or other arthritis medicines should not take VIOXX. In rare cases, serious stomach problems, such as bleeding, can occur without warning.

Tell your doctor if you have liver or kidney disease, or a history of angina, heart attack, or a blocked artery in your heart. VIOXX cannot take the place of aspirin for the prevention of heart attack or stroke. VIOXX should not be used by women in late pregnancy.

VIOXX has been extensively studied in large clinical trials. Commonly reported side effects included upper respiratory infection, diarrhea, nausea, and high blood pressure. Report any unusual symptoms to your doctor.

Please see the Patient Product Information for VIOXX on the next page for additional information that should be discussed with your doctor.

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You should read this information before you start taking VIOXX®. Also, read the leaflet each time you refill your prescription, in case any information has changed. This leaflet provides only a summary of certain information about VIOXX. Your doctor or pharmacist can give you an additional leaflet that is written for health professionals that contains more complete information. This leaflet does not take the place of careful discussions with your doctor. You and your doctor should discuss VIOXX when you start taking your medicine and at regular checkups.

What is VIOXX?

VIOXX is a nonsteroidal anti-inflammatory drug (NSAID) that is used to reduce pain and inflammation (swelling and soreness). VIOXX is available as a tablet or a liquid that you take by mouth.

VIOXX is a medicine for:

- relief of osteoarthritis (the arthritis caused by age-related "wear and tear" on bones and joints)
- relief of rheumatoid arthritis in adults
- management of acute pain in adults (like the short-term pain you can get after a dental or surgical operation)
- treatment of menstrual pain (pain during women's monthly periods).

Who should not take VIOXX?

Do not take VIOXX if you:

- have had an allergic reaction such as asthma attacks, hives, or swelling of the throat and face to aspirin or other NSAIDs (for example, ibuprofen and naproxen).
- have had an allergic reaction to rofecoxib, which is the active ingredient of VIOXX, or to any of its inactive ingredients. (See Inactive Ingredients at the end of this leaflet.)

What should I tell my doctor before and during treatment with VIOXX?

Tell your doctor if you are:

- pregnant or plan to become pregnant. VIOXX should not be used in late pregnancy because it may harm the fetus.
- breast-feeding or plan to breast-feed. It is not known whether VIOXX is passed through to human breast milk and what its effects could be on a nursing child.

Tell your doctor if you have:

- history of angina, heart attack or a blocked artery in your heart
- kidney disease
- liver disease
- heart failure
- high blood pressure
- had an allergic reaction to aspirin or other NSAIDs
- had a serious stomach problem in the past.

Tell your doctor about:

- any other medical problems or allergies you have now or have had.
- all medicines that you are taking or plan to take, even those you can get without a prescription.

Tell your doctor if you develop:

- serious stomach problems such as ulcer or bleeding symptoms (for instance, stomach burning or black stools, which are signs of possible stomach bleeding).
- unexplained weight gain or swelling of the feet and/or legs.
- skin rash or allergic reactions. If you have a severe allergic reaction, get medical help right away.

How should I take VIOXX?

VIOXX should be taken once a day. Your doctor will decide what dose of VIOXX you should take and how long you should take it. You may take VIOXX with or without food.

Can I take VIOXX with other medicines?

Tell your doctor about all of the other medicines you are taking or plan to take while you are on VIOXX, even other medicines that you can get without a prescription. Your doctor may want to check that your medicines are working properly together if you are taking other medicines such as:

- warfarin (a blood thinner)
- theophylline (a medicine used to treat asthma)
- rifampin (an antibiotic)
- ACE inhibitors (medicines used for high blood pressure and heart failure)
- lithium (a medicine used to treat a certain type of depression).

VIOXX cannot take the place of aspirin for prevention of heart attack or stroke. If you are currently taking aspirin for this purpose, you should not discontinue taking aspirin without consulting your doctor.

What are the possible side effects of VIOXX?

Serious but rare side effects that have been reported in patients taking VIOXX and/or related medicines have included:

- Serious stomach problems, such as stomach and intestinal bleeding, can occur with or without warning symptoms. These problems, if severe, could lead to hospitalization or death. Although this happens rarely, you should watch for signs that you may have this serious side effect and tell your doctor right away.
- Heart attacks and similar serious events have been reported in patients taking VIOXX.
- Serious allergic reactions including swelling of the face, lips, tongue, and/or throat which may cause difficulty breathing or swallowing and wheezing occur rarely but may require treatment right away. Severe skin reactions have also been reported.
- Serious kidney problems occur rarely, including acute kidney failure and worsening of chronic kidney failure.
- Severe liver problems, including hepatitis, jaundice and liver failure, occur rarely in patients taking NSAIDs, including VIOXX. Tell your doctor if you develop symptoms of liver problems. These include nausea, tiredness, itching, tenderness in the right upper abdomen, and flu-like symptoms.

In addition, the following side effects have been reported: anxiety, blurred vision, colitis, confusion, decreased levels of sodium in the blood, depression, fluid in the lungs, hair loss, hallucinations, increased levels of potassium in the blood, insomnia, low blood cell counts, menstrual disorder, palpitations, pancreatitis, severe increase in blood pressure, tingling sensation, unusual headache with stiff neck (aseptic meningitis), vertigo.

More common, but less serious side effects reported with VIOXX have included the following:

Upper and/or lower respiratory infection and/or inflammation
Headache
Dizziness
Diarrhea
Nausea and/or vomiting
Heartburn, stomach pain and upset
Swelling of the legs and/or feet
High blood pressure
Back pain
Tiredness
Urinary tract infection.

These side effects were reported in at least 2% of osteoarthritis patients receiving daily doses of VIOXX 12.5 mg to 25 mg in clinical studies.

The side effects described above do not include all of the side effects reported with VIOXX. Do not rely on this leaflet alone for information about side effects. Your doctor or pharmacist can discuss with you a more complete list of side effects. Any time you have a medical problem you think may be related to VIOXX, talk to your doctor.

What else can I do to help manage my arthritis pain?

Talk to your doctor about:

- Exercise
- Controlling your weight
- Hot and cold treatments
- Using support devices.

What else should I know about VIOXX?

This leaflet provides a summary of certain information about VIOXX. If you have any questions or concerns about VIOXX, osteoarthritis, rheumatoid arthritis or pain, talk to your health professional. Your pharmacist can give you an additional leaflet that is written for health professionals.

Do not share VIOXX with anyone else; it was prescribed only for you. It should be taken only for the condition for which it was prescribed.

Keep VIOXX and all medicines out of the reach of children.

Inactive Ingredients:

Oral suspension: citric acid (monohydrate), sodium citrate (dihydrate), sorbitol solution, strawberry flavor, xanthan gum, sodium methylparaben, sodium propylparaben.

Tablets: croscarmellose sodium, hydroxypropyl cellulose, lactose, magnesium stearate, microcrystalline cellulose, and yellow ferric oxide.

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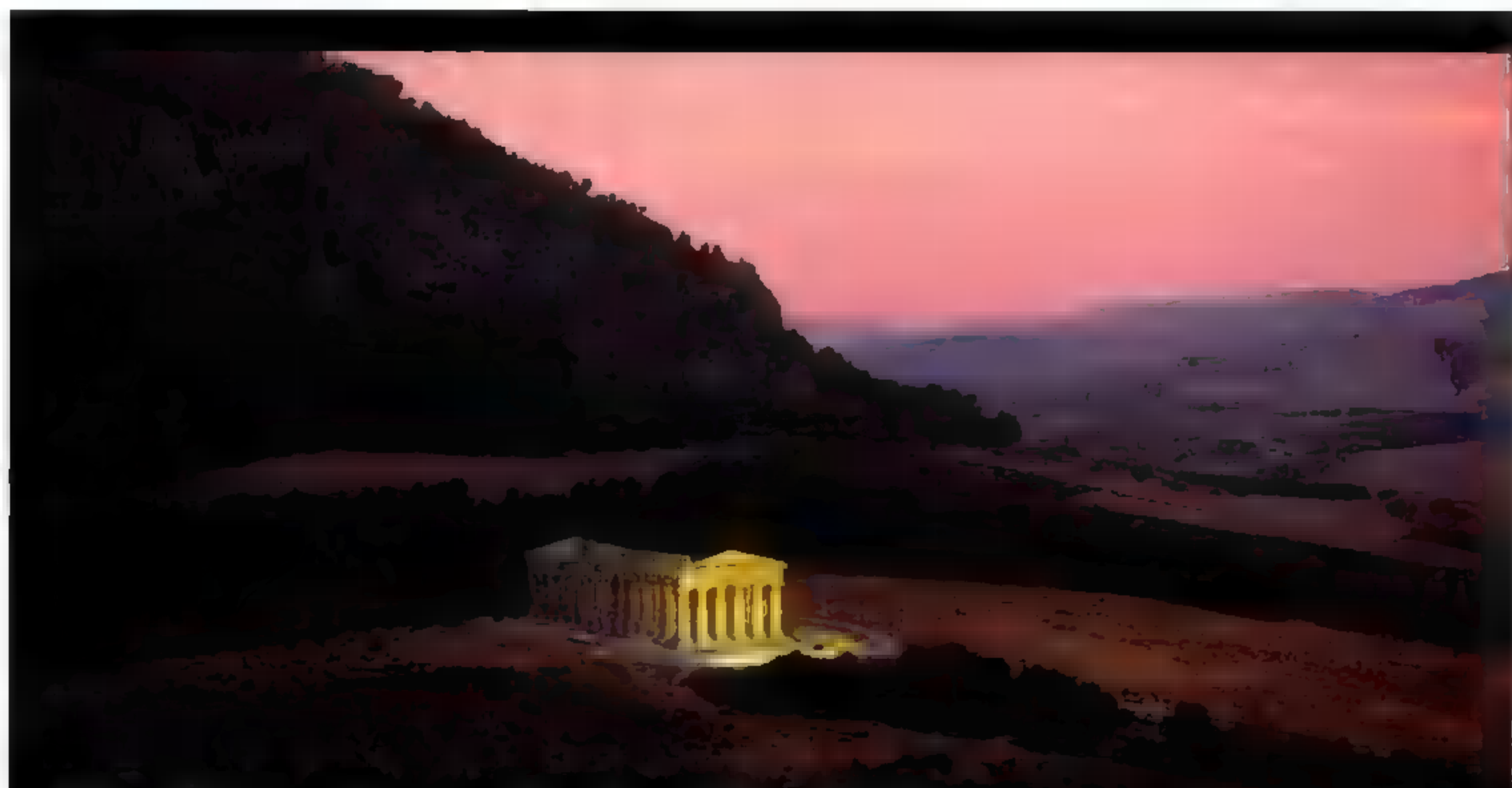


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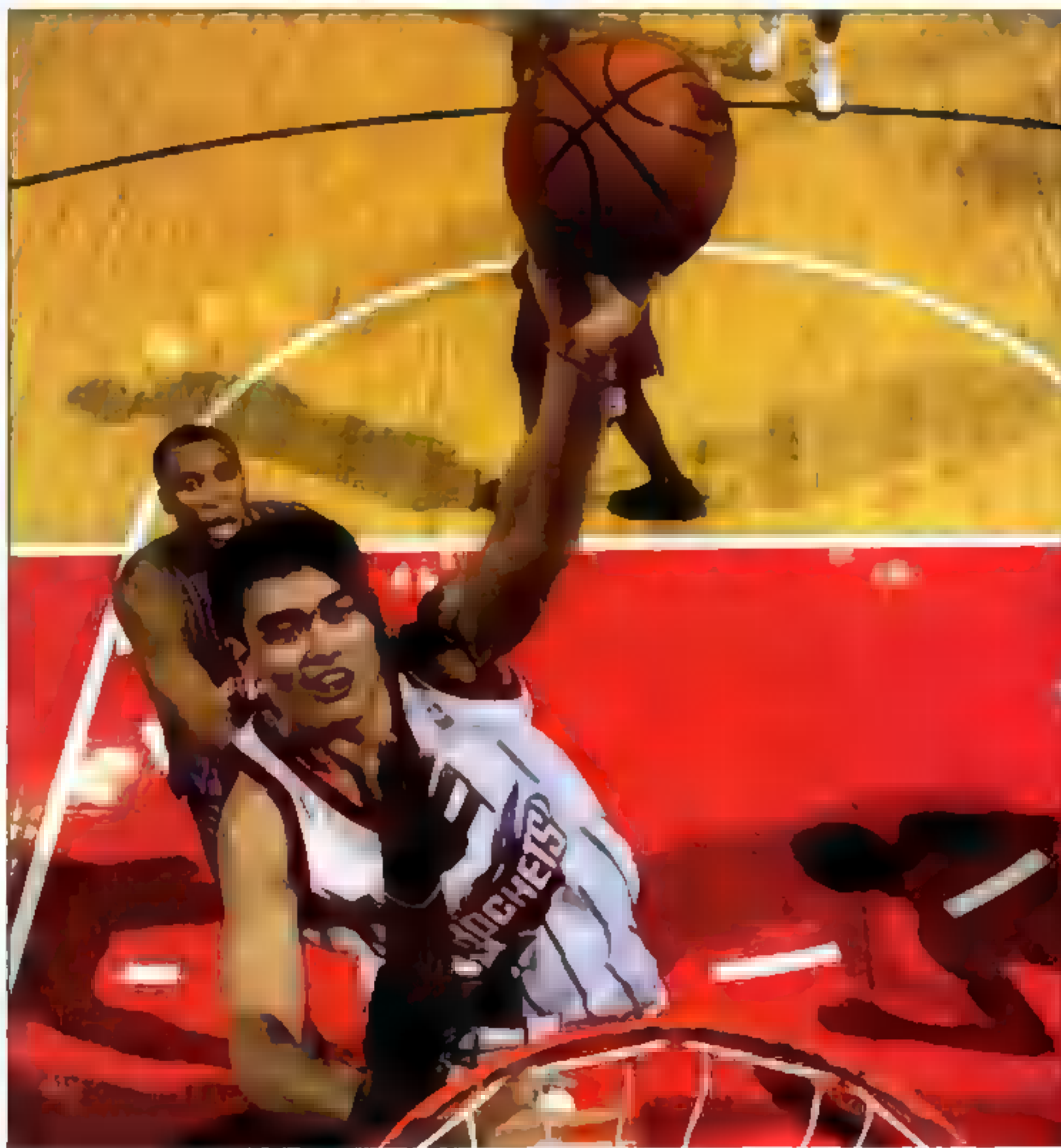
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DAVID J. PHILLIP, AP PHOTO (ABOVE); JACQUELYN ZETTLER

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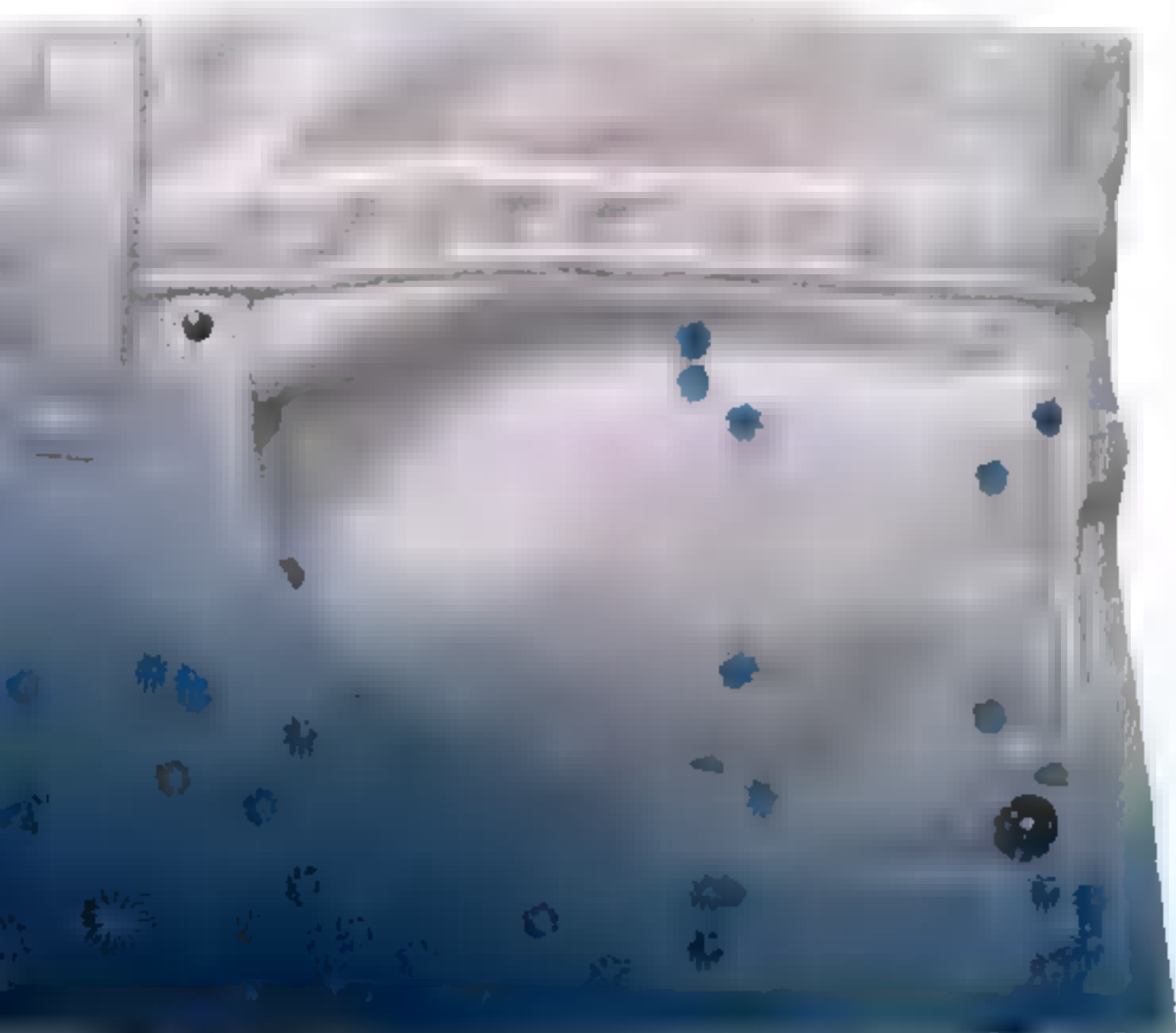
CHEMISTRY

We Got the Blues

Humanity's obsession with a certain color

When we finally get around to writing the entire story of civilization, we'll devote a chapter to the color blue. Sure, children around the world choose red as their favorite color. But that's just a phase, like tearing the crust off bread. Make no mistake: Blue rules.

For thousands of years humans have found ingenious ways to turn things blue. In the ancient Mediterranean, biblical blue dye came from a hermaphroditic snail with a gland that generates a fluid that becomes



blue when exposed to air and light—at least when the mollusk is feeling masculine. “They had to extract the glands when the snails were more male than female,” explains Tony Travis, a historian and chemist at Jerusalem’s Hebrew University.

Another blue dye came from a plant called woad. Its leaves had to be ground and fermented before the pigment emerged. Celts painted their bodies with it (think Mel Gibson in

Braveheart). Medieval scribes illustrated manuscripts with it.

The blue in woad came from a molecule scientists refer to as indigo. But woad wasn’t the best source of blue. Another plant—also known as indigo—produced the color more effectively. Indigo plantations sprawled across Asia, while woad lost luster.

Eventually synthetic dyes replaced natural ones. In 1897 the Germans manufactured the first synthetic indigo from coal-tar derivatives. Synthetic dyes triggered an explosion of blue fashions in the 20th century. Policemen switched from black uniforms to blue. The blue blazer replaced the black suit. And in the 1950s blue jeans took off, radiating youth and rebellion.

Next up: Biotech blue. When Australian toxicologist Elizabeth Gillam was studying bacteria implanted with human DNA, her cultures unexpectedly turned blue. She suspected a mold contamination. But after conferring with Fred Guengerich, a colleague at Vanderbilt University, Gillam realized she’d stumbled onto something wonderful: The bacteria were producing the indigo molecule as part of their metabolism. “This is a good lesson for student scientists,” says Gillam. “If something looks bizarre, don’t discount it.

It might be much more interesting than the result you expected.”

Biotech indigo could be used to create blue plant tissues, including flower petals (imagine a perfectly blue rose). Scientists speculate that the process might even yield blue cotton, which would mean your jeans wouldn’t need any dye. But then how would we ever get that nice faded look?

—Joel Achenbach

WASHINGTON POST STAFF WRITER

IT MATTERS


Do blue jeans look more gray than blue to you?

One in ten men and one in 200 women are born with inherited color blindness. Difficulty distinguishing shades of red and green is most common; trouble with blues and yellows is more rare. But genes aren’t the only cause. Some chemicals—solvents used in dry cleaning and in manufacturing products from powerboats to rayon—can also damage color vision. University of Modena and Reggio Emilia professor Fabriziomaria Gobba says acquired color blindness matters because it’s an early warning that toxins are building up in the body. His work, along with studies from China, Japan, and Turkey, suggests that officially “safe” exposure levels may be too high to protect the health of workers who aren’t ready to settle for gray jeans.

—Lynne Warren

WEBSITE EXCLUSIVE

Learn more about making things blue—and find a link ■ Joel Achenbach’s work—at nationalgeographic.com/ngm/resources/0306.

The image is a vertical composition. On the left side, there is a map of India with a red and black color scheme. On the right side, there is a photograph of a building with a series of arches, possibly a well or a public structure, showing signs of decay and neglect. The background is a light blue gradient.

Branded as impure
from the moment of birth,
one out of six Indians
lives—and suffers—
at the bottom of
the Hindu caste system.

They are

Untouchable



ble

By TOM O'NEILL

Photographs by WILLIAM ALBERT ALLARD

BOTH NATIONAL GEOGRAPHIC STAFF

LAXMAN SINGH LOST HIS LEGS AFTER A BEATING BY UPPER CASTE VILLAGERS IN RAJASTHAN.



Castebound



Her fate scripted by Hindu law, an Untouchable girl can imagine little else than working along the Yamuna River in Delhi as a Dhobi. Members of this clothes-washing caste handle items “polluted” by blood or human waste.



Exploited



For two dollars a day, Untouchable women load thousands of bricks at a dust-choked kiln in Rajasthan. This job, while not restricted to unclean castes, goes largely to Untouchables, their low status condemning them to the most menial work.

The sins of Girdharilal Maurya are many, his attackers insisted. He has bad karma. Why else would he, like his ancestors, be born an Untouchable, if not to pay for his past lives?

Look, he is a leatherworker, and Hindu law says that working with animal skins makes him unclean, someone to avoid and revile. And his unseemly prosperity is a sin. Who does this Untouchable think he is, buying a small plot of land outside the village? Then he dared speak up, to the police and other authorities, demanding to use the new village well. He got what Untouchables deserve.

One night, while Maurya was away in a nearby city, eight men from the higher Rajput caste came to his farm. They broke his fences, stole his tractor, beat his wife and daughter, and burned down his house. The message was clear: Stay at the bottom where you belong.

Girdharilal Maurya took his family and fled the village of Kharkada in India's western state of Rajasthan. It took two years for him to feel safe enough to return—and then only because human rights lawyers took up his case, affording him a thin shield of protection.

"I see them almost every day," Maurya now says of his attackers. "They roam around freely." Maurya has agreed to meet me—after dark—in the dirt courtyard of his village house. He is a tall, handsome man of 52, his hair white, his face lined with worry. On a chilly February night he pulls a bathrobe tight around him. His wife moves in the shadows preparing tea. They live with the rest of their caste on the southern end of the village, downwind of the upper caste families who believe that they must not smell Untouchables.

The court case against his attackers drags on, Maurya explains in a tense, level voice. He tries to sound positive: Untouchables use the well pump now; one of his sons has advanced to college, the first of his caste from the village.

But once Maurya confesses that he is still scared of his attackers, his voice rises—and his wife turns up the radio inside to mask it. "The government refuses to address problems like this business about the well because they say the caste system legally does not exist. Well, look around you. People treat animals better

than us. This is not natural. We're only asking for human rights." His voice grows even louder to beseech the surrounding night: "Why did the gods let me be born in such a country?"

To be born a Hindu in India is to enter the caste system, one of the world's longest surviving forms of social stratification. Embedded in Indian culture for the past 1,500 years, the caste system follows a basic precept: All men are created unequal. The ranks in Hindu

Amrutbhai Sarasiya does his job, immersing himself in excrement to unclog a sewer in Ahmadabad in Gujarat state. He is a Bhangi, a member of a scavenger caste—lowest of the hundreds of Untouchable castes. Some 10,000 Bhangis in Ahmadabad earn money by manually cleaning latrines, sewers, and gutters, and by removing dead animals from the streets. Working without protective gear, many suffer from stomach and lung infections. After this picture was taken, Sarasiya was rebuffed at several neighborhood wells before being given water to clean himself.

Caste discrimination, including the practice of Untouchability, is forbidden by the Indian constitution, but police and courts rarely enforce the law.



society come from a legend in which the main groupings, or *varnas*, emerge from a primordial being. From the mouth come the Brahmans—the priests and teachers. From the arms come the Kshatriyas—the rulers and soldiers. From the thighs come the Vaisyas—merchants and traders. From the feet come the Sudras—laborers. Each varna in turn contains hundreds of hereditary castes and sub-castes with their own pecking orders.

A fifth group describes the people who are *achuta*, or untouchable. The primordial being does not claim them. Untouchables are outcasts—people considered too impure, too polluted, to rank as worthy beings. Prejudice defines their lives, particularly in the rural areas, where nearly three-quarters of

India's people live. Untouchables are shunned, insulted, banned from temples and higher caste homes, made to eat and drink from separate utensils in public places, and, in extreme but not uncommon cases, are raped, burned, lynched, and gunned down.

The ancient belief system that created the Untouchables overpowers modern law. While India's constitution forbids caste discrimination and specifically abolishes Untouchability, Hinduism, the religion of 80 percent of India's population, governs daily life with its hierarchies and rigid social codes. Under its strictures, an Untouchable parent gives birth to an Untouchable child, condemned as unclean from the first breath.

Yet Untouchables don't look different from





Anonymous



Blatant acts of illegal discrimination—denying Untouchables access to temples and wells, forcing them to live in separate settlements—often disappear in India’s chaotic cities. All social groups mingle at a market in Mumbai, a magnet for Untouchables escaping village prejudices.



other Indians. Their skin is the same color. They don't wear rags; they are not covered with sores. They walk the same streets and attend the same schools.

In Untouchable villages, women sweep their dirt yards and wash the family clothes. Children play cricket, usually with tree limbs and tennis balls, and paste pictures of athletes and pop stars on the walls of their one-room mud houses. Men bend to their work, sewing shoes, stitching carpets, drying cow dung for fuel, and, like men of every caste in every village, throw money away on drink and gambling.

But despite outward signs of normalcy, Untouchables may as well wear a scarlet tattoo on their foreheads to advertise their status. "You cannot hide your caste," insists Sukhdeo Thorat, a faculty member at Jawaharlal Nehru University in New Delhi and among the few Untouchables in India with a Ph.D. in economics. "You can try to disguise it, but there are so many ways to slip up. A Hindu will not feel confident developing a social relationship without knowing your background. Within a

couple of months, your caste will be revealed." Family name, village address, body language all deliver clues, but none so much as occupation.

Untouchables perform society's "unclean work"—work that involves physical contact with blood, excrement, and other bodily "defilements" as defined by Hindu law. Untouchables cremate the dead, clean latrines, cut umbilical cords, remove dead animals from the roads, tan hides, sweep gutters. These jobs, and the status of Untouchability, are passed down for generations. Even the vast number of Untouchables who work at "clean" jobs, mostly low-paying farmwork for landlords, are considered impure. In an outwardly free society, Untouchables are trapped at the bottom of a system that can't function without discrimination.

Many people would point out that the crudest, most overt forms of discrimination have largely disappeared, the result of sporadic reform movements before and after India's independence in 1947. It's true that at least in the public sphere, Untouchables have made progress since the days—within living



Upper caste aversion to killing cattle, eating beef, and handling animal hides gives Untouchables a monopoly in the tanning business. At a rural tannery (left) a member of the Chamar leatherworking caste softens a water buffalo skin. Because touching a corpse (above) also constitutes a polluting act, only Untouchables cremate and bury the dead.



“People treat animals better than us. This is not

memory—when they were beaten if their shadow touched a higher caste person, wore bells to warn of their approach, and carried buckets so their spit wouldn't contaminate the ground. Untouchables couldn't enter schools or sit on a bench near a higher caste person.

The 1950 constitution mandates a quota system that reserves seats in the federal legislature equal to the Untouchable share of the population: 15 percent. In legal and administrative parlance Untouchables are now known as the Scheduled Castes. Reserved spots extend to positions in state legislatures, village councils, civil service, and university classrooms.

India's ruling parties have supported this quota program despite widespread opposition, some of it violent. Mobs rioted for 78 days in 1981 in the state of Gujarat when a high-caste

student was denied entry to a medical school to make space for an Untouchable. Though many quota positions go unfilled, particularly at universities, employment in the vast Indian bureaucracy has lifted the living standard for some Untouchables, propelling thousands into the middle class.

But for all the laws and regulations on the books, the hard heart of caste remains unmoved. There are 160 million Untouchables in India—a country that trumpets itself as a model for developing nations: the world's most populous democracy, a modern power outfitted with software industries, communication satellites, and plants for making nuclear energy and nuclear bombs. During the winter I spent in India, hardly a day passed that I didn't hear or read of acid thrown in a boy's face, or



Discarded chicken scraps bought from a restaurant barely make a meal for Untouchables in Bihar, one of India's poorest states. These villagers belong to the Musahar, or rat-eaters, caste, its members known for hunting rodents. Musahar women, many of whom work as field hands, have begun to agitate for better living conditions. This takes courage, says a local activist. "If an Untouchable woman demands or questions something and a landlord doesn't like it, he will beat or sexually harass her."

Tripathy hews to the words of Manu. He explained that as a Brahman he must uphold the code of purity, the basis for dividing society from top to bottom. "I do not eat meat or drink alcohol. I will not eat vegetables like ginger or onion that are grown in the ground. My mind should be as clean as my clothes."

A proper Brahman should never come in contact with an Untouchable, Tripathy instructed. "A Brahman wouldn't even touch the feet of Gandhi," he said, referring to the deified leader of India's independence. "Gandhi was a Vaisya; Brahmans are superior."

Manu also instructs that to touch a corpse after final death ceremonies brings great contamination. So it falls to Untouchable castes, such as the Dom, to cremate the dead.

The Doms work along the steep, stair-cut banks of the Ganges at Varanasi, where the Hindu faithful bring their dead to be burned within sight of the sacred river. Dodging gusts of smoke at Harishchandra Ghat on the river's edge, I watched as a Dom dressed in shorts and a T-shirt managed an old woman's cremation. Matru Choudhary, head of the local Dom community, provided running commentary in

natural. We're only asking for human rights."

a wife raped in front of her husband, or some other act whose provocation was simply that an Untouchable didn't know his or her place.

The Hindu caste system has its own instruction manual. The *Laws of Manu*, compiled at least 2,000 years ago by Brahman priests, prescribes for each varna what to eat, whom to marry, how to earn money, when to fight, how to keep clean, whom to avoid. "Manu is engraved inside every Hindu," said Umashankar Tripathy, a Brahman priest I met in Varanasi, the revered pilgrimage city located on the banks of the Ganges River. Tripathy sat cross-legged on a straw mat in the temple where he teaches. He wore the traditional dhoti, a long loincloth with a tunic buttoned over it. His clothes were spotless, his hands as soft as fine leather gloves.

English he said he had learned from tourists. "The body takes three hours to burn. Sometimes less, with more wood. The richer the family, the more wood they buy from us."

A group of men in white dhotis sat silently on the steps above the pyre. They were the male relatives of the deceased. Traditionally, women are not allowed at cremations because they might cry; the tears that fall from their eyes are regarded, like all bodily fluids, as pollutants.

The men waited. On the muddy riverbank two Dom teenagers poked at the pyre as dispassionately as if they were tending a cooking fire. One Dom used a stick to push a leg back into the pile of flaming logs. Two cows warmed themselves by the fire.

When the wood had burned to ashes, a Dom pulled out the dead woman's breastbone,



still intact, and gave it to the eldest son, who underhanded it into the Ganges. As soon as the family left, Dom children scampered across the darkened earth, their eyes lifted to a small purple kite. "Later we'll rake the ashes," said Choudhary. "If we're lucky, we'll find gold teeth or nose studs. We get to keep them."

Below the Dom exist still other castes, the lowest of the low. Known as Bhangis, Pakhis, Sikkaliars, depending on the region, they are the manual scavengers. In villages and cities they cart away feces from public latrines, clean the toilet holes of private houses, and sweep up animal droppings from streets. Nonflush latrines are banned in most states, but the law is not enforced, and municipalities openly hire scavengers, most of them women, to empty them, usually for less than a dollar a day. Even other Untouchables will not take food or drink from a manual scavenger.

One morning in Ahmadabad, the largest city in the western state of Gujarat, I followed a team of five Bhangis assigned to unclog sewers in the middle-class neighborhood of

Khanpur. They belonged to a scavenger workforce of more than 10,000 in the city. The team, dressed in clean, neat street clothes, stopped at a manhole outside a mosque. Dinesh Parmar, a lithe 25-year-old with a gold chain glittering around his neck, removed the cover. Cockroaches scurried from the darkness as the stench from below filled the street.

Parmar hesitated for only an instant, then dropped into the hole—with no gloves, no gas mask. His body hidden inside, he methodically lifted bucket after bucket of excrement over his head, upending them on the street. Flies clustered thickly. Then he stopped, dizzy from the carbon monoxide seeping out of the sewer. The supervisor nodded, allowing Parmar to climb out. The previous year 30 Bhangis had died from gas poisoning in the sewers of Ahmadabad.

Parmar left brown footsteps as he led the way to a nearby lane. He climbed down into several more manholes to scoop up clots of sludge. Women stared from doorways, veils pressed to their noses, speaking only to



So close and so unreachable, a luxury high-rise in Mumbai stands aloof from a decaying housing complex occupied by Untouchables. Inside, the modest blessing of a fan cools a napping child. Almost the only way an Untouchable can rise in Indian society is to land a government job or university scholarship, available to a few under a federal quota system.



Many Untouchables, particularly educated ones,

complain that their toilets were jammed. After the last hole, Parmar stood mutely in the middle of the lane, arms and legs coated with filth.

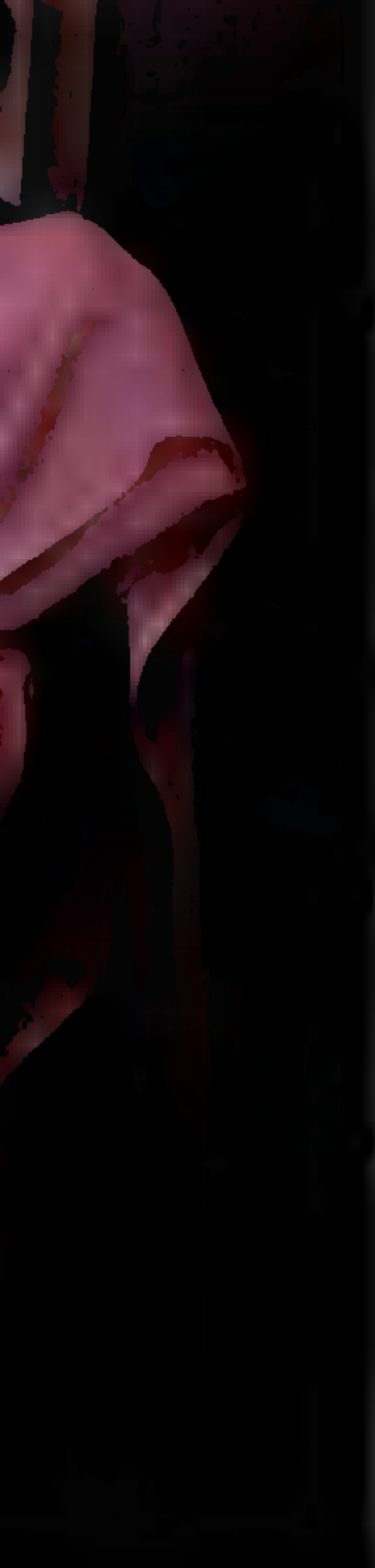
Parmar asked the watching women for soap and water. Finally one came forward, shrieking at the others that they should be ashamed. Parmar undressed on the street and meticulously washed his clothes, body, and hair.

"It is my fate. I won't get another job, I'm not educated," Parmar said as he walked along the street with his crew, dripping wet but clean again. "Some places I get help to get washed up, others not, but even good people never offer me a cup of tea." Parmar has a daughter. "I will educate her," he vowed. "If her fate is good, she'll get a better job." He broke away and chased after his co-workers, puddles drying quickly behind him.

Conscience has occasionally moved upper caste Hindus to fight the concept of Untouchability. Mahatma Gandhi himself led one of the early and most brazen campaigns to eliminate Untouchability. At the ashram, or communal settlement, he founded in 1915 in Ahmadabad, Gandhi shocked his patrons and followers by accepting a family of Untouchables. Soon afterward Gandhi adopted the family's Untouchable daughter.

In writings and speeches Gandhi implored Indians to reject the notion that any human is innately impure and to cease discriminating against Untouchables. At his ashram all residents performed traditionally unclean chores.

Gandhi also bestowed on Untouchables a new name, Harijan, which means "people of God." And in 1933 he embarked on his



Healing touch: Dr. S. Tamilarasan examines a fellow Untouchable at a busy clinic he and his father run in Devakottai, a city in the southern state of Tamil Nadu. Patients commonly suffer from malnutrition, typhoid, and tuberculosis. At one of only a few medical facilities in the area, the two doctors serve many higher caste patients, a case of necessity outweighing prejudice.

“He did play a significant role in gaining Indian independence with his nonviolent movement. But he’s also responsible for maintaining the orthodoxy of the caste system, India’s unfortunate gift to the world.” Even the Harijan label, many contend, invokes pity rather than respect. Politically active Untouchables prefer the term Dalit, which means “oppressed.”

Gandhi’s greatest perceived sin, however, was to undermine a man named Bhimrao Ramji Ambedkar—the chief draftsman of the Indian constitution, the architect of India’s affirmative action program, author of a dozen books, founder of the first Untouchable political party, and India’s one true Untouchable hero.

Ambedkar was born in 1891 as a Mahar, a member of an Untouchable servant caste. Made to sit apart from the higher caste boys at school, Ambedkar defied the odds and proved himself a brilliant student. Aided by scholarships, he earned doctorates at Columbia University in New York City and at the London School of Economics.

Ambedkar returned to Bombay (now Mumbai) in 1923 to work as a barrister and to join the emerging Untouchables movement. He was outspoken and confrontational, once ending a political rally by burning a copy of the *Laws of Manu*. In that one heretical act he declared war. “Nothing can emancipate the outcaste

would love to knock Gandhi off his pedestal.

controversial Harijan tour, defying the wishes of the Hindu establishment as he traveled across India agitating for such radical measures as the opening of temples to Untouchables. Near the end of his travels Gandhi proclaimed that “Untouchability is on its last legs.” It was wishful thinking.

Historians say that Gandhi deserves great credit for pushing the issue of Untouchability onto the national stage and for lending his moral stature to the campaign to abolish it. Yet he never actually renounced the Hindu caste system, and the concrete results of his actions were few. Many Untouchables, particularly educated ones, would love to knock Gandhi off his pedestal. “Gandhi is the most misunderstood man in the Western world,” contends Professor Thorat, the Untouchable economist.

except the destruction of the caste system,” he declared. His position was clearly defined: Abolish the religious underpinning of civil life.

By the early 1930s Ambedkar had become a leading spokesman for the Untouchable cause. When the British colonial government acceded to demands by Untouchable leaders to bring India’s bottom castes into the political system, Ambedkar pushed for a separate electorate. He feared that an assertive Untouchable could never win an election open to voters of all castes. He wanted Untouchable officeholders elected exclusively by Untouchables.

Gandhi resisted Ambedkar’s position on religious principles, fearing that secular solutions to caste problems would destroy Hinduism. And in September 1932, when it appeared that the British would side with



A baby girl found abandoned beneath a bridge finds a home in the arms of a Bihar midwife who goes by the name of Bedami Devi. Since exposure to blood brings impurity, Untouchables deliver most babies in rural India—often taking extra pay to kill females. Devi belongs to a group fighting infanticide.

The garb worn by Nita Solanki, an Untouchable bride in Gujarat, is perhaps the finest she will ever put on.

“You cannot hide your caste. You can try to



disguise it, but there are so many ways to slip up.™



Parmar has a daughter. “I will educate her,” he

Ambedkar, Gandhi protested by entering a “fast unto death.” Ambedkar had little choice but to surrender after a few days as Gandhi weakened. Ambedkar won a guarantee of seats for Untouchables in the legislation, but Gandhi’s actions broke the momentum for radical change.

Ambedkar’s inability to eradicate the caste system from Hinduism led him finally to abandon the religion. In October 1956, in the city of Nagpur, Ambedkar converted to Buddhism. Hundreds of thousands of Untouchables quickly followed his example. But two months later Ambedkar died of natural causes, and religious conversion, though still popular among some urban Untouchables, failed as a mass movement.

In important ways, though, Ambedkar lives

on. Statues and paintings of him—dressed in a blue suit, wearing dark-rimmed glasses, holding a bound copy of the constitution—appear in almost every Untouchable village neighborhood and in many urban slums.

Fresh orange marigold blossoms ringed his bust the day I visited Ramabai Colony, a slum in Mumbai named after Ambedkar’s wife. Harish K. Ahire, an Untouchable doctor, was my guide. As we walked through the busy, sunbaked lanes, I saw Ambedkar’s face everywhere—on walls of houses, inside small Buddhist temples with peeling paint, above doorways, on street signs. Residents spoke eagerly of how Ambedkar inspired their parents to move to the city a generation or two ago in order to escape the village choke hold of caste. Yet Ramabai’s sewers are open, its



Uplifted by song, Sneha, an Untouchable eighth grader, leads classmates in a hand-clapping rehearsal of a patriotic anthem to be performed at a concert celebrating India's Republic Day. Kasturba Balika School in New Delhi provides education to some 700 underprivileged girls, most of them Untouchables. It is named for the wife of Mahatma Gandhi, the man who fought—and failed—to end the practice of Untouchability.

anonymously and even satisfactorily, enjoying some freedom of choice. The slum may look like a defeat. But it represents a gritty, practical breakdown of caste, something worthy of Ambedkar's stare.

No comparable Untouchable leader with a wide following has emerged since Ambedkar's death. The movement is fractured, state by state. The best hope for change currently rests with a small but growing band of grassroots organizers scattered across India. These activists work on the village level, the breeding ground for the caste system, where they teach people skills and tactics with which to battle fate.

Finding and training leaders has become a calling for Martin Macwan, one of the most visible Untouchable organizers since Ambedkar. Macwan is the founder and director of the Navsarjan Trust, a Gujarat-based organization that works for the enforcement of antidiscrimination laws. He led the Untouchables contingent that attended the United Nations' World Conference against Racism, held in 2001 in Durban, South Africa. The group demanded that caste discrimination be placed on the conference agenda, but India's government lobbied ferociously—and successfully—

vowed. "If her fate is good, she'll get a better job."

schools bad, and its residents plagued by disease. Had Ambedkar made any difference here?

Ahire introduced me to an Untouchable named Ambet Raghunath, a thin, barefoot man in his late 20s. He had left his home village near Varanasi and had come to Ramabai with 200 rupees, or four dollars. He now works in a shop making and selling betel nut chews. He earns the equivalent of about \$40 a month, a kingly sum for a village Untouchable, most of which he sends back to his wife, whom he visits once a year. "I never will go back there to live," he said. "Here I have freedom to do whatever job I want and to live where I want."

In the Ramabai slum all castes live together, drink from the same well, and stand in the same lines, united by poverty. As in some other urban areas, Untouchables can live here

to prevent a formal hearing on caste.

"A lot of what I do has to do with childhood memories," Macwan said from the back seat of an SUV bouncing over ruts in the Gujarat countryside. Years of riding over rough roads have left Macwan with a herniated disk, and now at 41 he takes along a special cushion. He has a boyish, almost sweet face. Add his crisp blue shirt and bushy mustache, and this firebrand looks like a high school counselor.

Macwan, a member of a cloth-weaving caste, can't forget the early humiliations: having water poured into his hands rather than being offered a glass; being ridiculed for wearing shoes not appropriate for his caste; watching his mother work for almost nothing in a lung-choking tobacco snuff factory. He received a scholarship to a Jesuit seminary but grew



Hopeless



Hours pass as slowly as drifting dust for a boy whose Untouchable mother hauls rocks at a Bihar quarry. The serf-like existence of Untouchables for the past 1,500 years makes scholars suspect that the caste system has survived for economic reasons as much as religious ones.



“I am clean. I don’t smoke or drink or eat meat.”

disillusioned with what he saw as the church’s indifference to the poor. After gaining a law degree in 1983, he began working in Untouchable villages on land-reform issues. Then came Golana.

In 1986 Macwan and another community activist were helping an Untouchable cooperative claim land that had been awarded to it by the state government in the village of Golana. Upper caste Kshatriya landowners, who illegally used the plot for a threshing ground, warned the Untouchables to drop their claim. Tensions rose. On a day when Macwan stayed away with a fever, the landlords attacked the Untouchable neighborhood. They killed four people, wounded 18, and burned down houses. One of the dead was Macwan’s colleague. “His skull was fractured; they shot

him at least six times,” he said. “A day doesn’t go by when I don’t remember it.”

Macwan led a counterattack, using as weapons the rights that are enshrined in the constitution. “The Kshatriyas assumed that they would pay some money and everyone would forget,” Macwan said. “They were wrong.” He gathered 150 witnesses and conducted a mock trial to prepare villagers for the formal court case. The end result: ten life sentences for murder. “The Kshatriyas had to sell their lands and factories to pay for lawyers,” Macwan said. “They lost their economic and moral power.”

The astonishing legal victory motivated Macwan to start his own organization with seed money from the Washington, D.C.–based Holdeen India Program. Navsarjan, which means “new beginning” in Gujarati, is now



His family of six shoe-horned into one room in the city of Bangalore, Chinnaraj counts himself fortunate to earn a hundred rupees, or about two dollars, a day as a cobbler. He heads a local leatherworkers union, which fights against police harassment and the razing of Untouchable work stalls.

also contend that the official numbers fail to represent the true extent of the violence, since only a small fraction of the crimes against Untouchables are reported, and fewer are investigated by the police.

There was anger—along with fear and helplessness—in the faces of the crime victims I met. In a farm shed in Rajasthan, where he was hiding with his family, Laxman Singh described how friends and relatives of the village council president beat him one night with stones and iron rods and “left me for dead.” He lost both legs to gangrene after lying untreated on a hospital floor for three days. His offense: filing a complaint with police after being denied wages for construction work he did on the council president’s home. “My attackers are searching for me,” he said. “They know what I would say against them in court.”

Some of the worst caste-based crimes occur in Bihar, a poor, anarchic state that borders on Nepal. For the past 30 years here, as part of a radical land-reform movement led by militants known as Naxalites, Untouchables have fought violence with violence, using guns to attack high-caste landlords. Private upper caste militias have sprung up to retaliate.

At his studio in Patna, Bihar’s capital city, photojournalist Krishna Murari Kishan showed me his massacre file: grisly images of dead

I do everything right. Why am I Untouchable?”

active in some 2,200 villages. More than 150 “barefoot lawyers” have been trained to help Untouchables use the courts to fight acts of discrimination and violence. Upper caste villagers may ask for legal help from Macwan’s group too, but he exacts a price: They have to accept a glass of water from an Untouchable.

To identify potential activists in Untouchable villages, Macwan has a simple test: “I look for anger.” What ignites the anger is usually an act of violence, witnessing it or suffering it. In recent years the reported cases of caste-based violence against Untouchables have risen as much as 25 to 30 percent in states like Bihar and Tamil Nadu, where large Untouchable populations live. Community activists see the surge in violence as a direct response to the new assertiveness of Untouchables. They

Untouchables, mostly women and children who had been burned alive in their homes. “Each week there are one or two killings,” said Kishan. “But that’s too few for me to cover. Editors will send me out only for massacres.”

Stowing a gun beneath his seat, Kishan drove me into the countryside to visit the headquarters of the most notorious militia, the Ranvir Sena, implicated in more than 500 deaths of Untouchables. One militia head, a Brahman, agreed to speak anonymously in a village called the Fortress because of its stockpile of weapons. He said that Untouchables had been given too many rights and that his group was simply defending itself. “If provoked, we will kill,” said the vigilante. “For every one of us killed, we will kill ten Untouchables. People should live within the caste system.”



Attacked



Their disfiguring scars will never let Ramprasad, left, and Ramlakhan forget the day they dared fish in a pond used by upper caste villagers in Uttar Pradesh. A mob doused the two Untouchables with acid. "I feel hate, I feel anger," says Ramlakhan, "but I can't do anything."

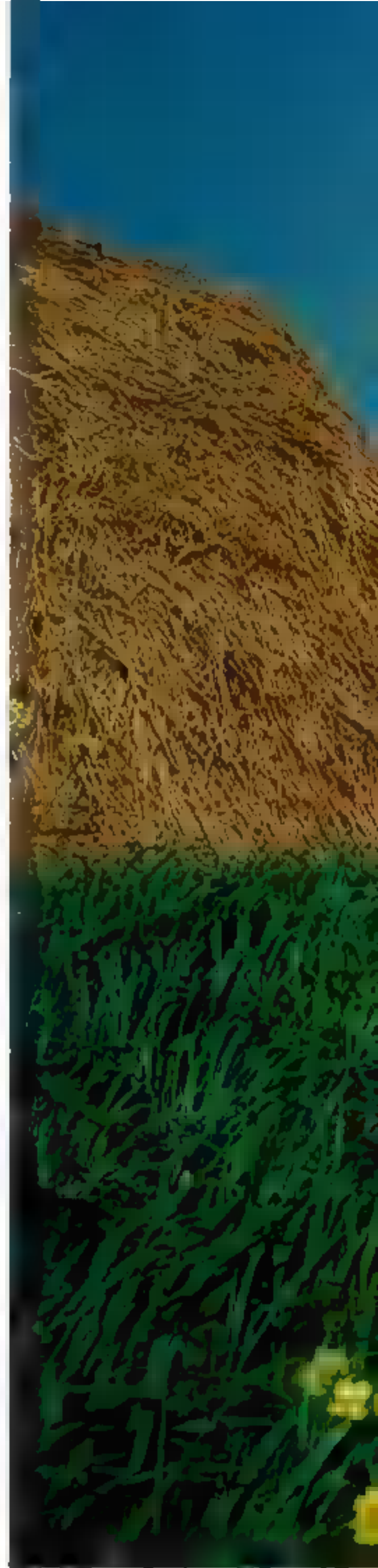
Many of the dead are women and children, I pointed out. Why target the innocent? He shrugged. "They get in the line of fire."

I look for anger," Martin Macwan had said. The angriest Untouchables, say many activists and organizers like Macwan, are women. They see their husbands abandoning their families to look for work in the cities. They see that men who remain are often dispirited and broken. An increasing number of women now believe that it is up to them to speak out and defend their families.

One angry woman's voice comes from Uttar Pradesh, India's most populous state. One day during my visit, Mayawati, a 46-year-old former schoolteacher and a member of the Untouchable Chamar leatherworking caste, addressed a political rally in Lucknow, the state capital. Several thousand people pressed together on muddy school grounds to hear Mayawati denounce the legacy of Manu and vow to bring the perpetrators of caste crimes to justice.

Mayawati is state leader of the Bahujan Samaj Party, an Untouchable-based political organization in northern India. At the time I heard her speak, she had also twice been named the state's chief minister—the first

Undisguised hatred of Untouchables incites members of a private army in a Bihar village. Outraged by the wage and land-reform demands of Untouchables, the Ranvir Sena, a militia led by landowners, has been implicated in the massacres of more than 500 Untouchables. The attackers have gone largely unpunished. Activists fear that the recent surge in violent incidents across India will only intensify as more Untouchables try to break the chains of caste.



Many of the dead are women and children. Why

Untouchable woman to rise to this position in India—and twice dethroned after only a few months when her coalition partner, a Brahman-dominated party, withdrew its support. Her aggressive pro-Untouchable policies had alienated her establishment allies.

A few weeks after the rally, Mayawati was once again named chief minister. Incredibly, her coalition partner was the same high-caste party, one that she had vilified in her speech. In a trade-off typical of the complicated, opportunistic dealings of Indian politics, the party of the lowest castes and the party of the highest castes had joined to stop the growing influence of the party representing the Sudras, or farm laborers' group, the level just above Untouchables. "It's like World War II when the U.S. allied with the Soviets,"

marveled Chandra Bhan Prasad, an Untouchable newspaper columnist.

Anger occasionally resounds at even the highest level of Indian government. From 1997 to 2002, K. R. Narayanan held the office of President of India, the first Untouchable to do so. President Narayanan stepped out of his largely ceremonial role, criticizing the caste system. In 2000, on the occasion of India's Republic Day, he paraphrased Ambedkar and said that unless Untouchability and discrimination against women were eliminated, "the edifice of our democracy would be like a palace built on a dung heap."

But no rhetoric will solve the plight of India's Untouchables, victims of a religion that judges them as subhuman and a rural society that exploits them practically as slaves. Some



target the innocent? “They get in the line of fire.”

hope lies in the new generation of activists that has emerged to fight through the legal system. And caste lines have blurred in the more anonymous and pragmatic settings of cities. But until an Untouchable leader like Ambedkar emerges or until Hinduism ceases playing a central role in politics and law enforcement—both distant prospects—the shame of the Untouchable condition will persist.

When and if fundamental change does come, it will be traumatic and almost certainly violent. It will probably happen slowly, village by village, where the first steps will be acts of defiance. Like the step taken by Babulal Bairwa, an Untouchable landowner in the Rajasthan village of Chakwara.

One morning, for reasons he himself is not sure of, Bairwa decided to bathe in the

village pond, off-limits to Untouchables. That evening a mob surrounded his house and threatened to kill him. Bairwa filed reports with the police and a human rights organization. Now he never travels alone for fear of attack. Bairwa expects that because of his legal challenge the pond will eventually become open to all castes. In the meantime he fights quietly and lives the only way he can. “I am clean. I don’t smoke or drink or eat meat. I work hard. I do everything right. Why am I Untouchable?”

Because he was born one. One hundred sixty million Indians serve this life sentence. □

▶ WEBSITE EXCLUSIVE

See footage from *Lesser Humans*—a documentary on the Bhangis, manual scavengers—and join our Forum at nationalgeographic.com/ngm/0306.

AMERICAN LANDSCAPES



Boundary
Text and photographs by



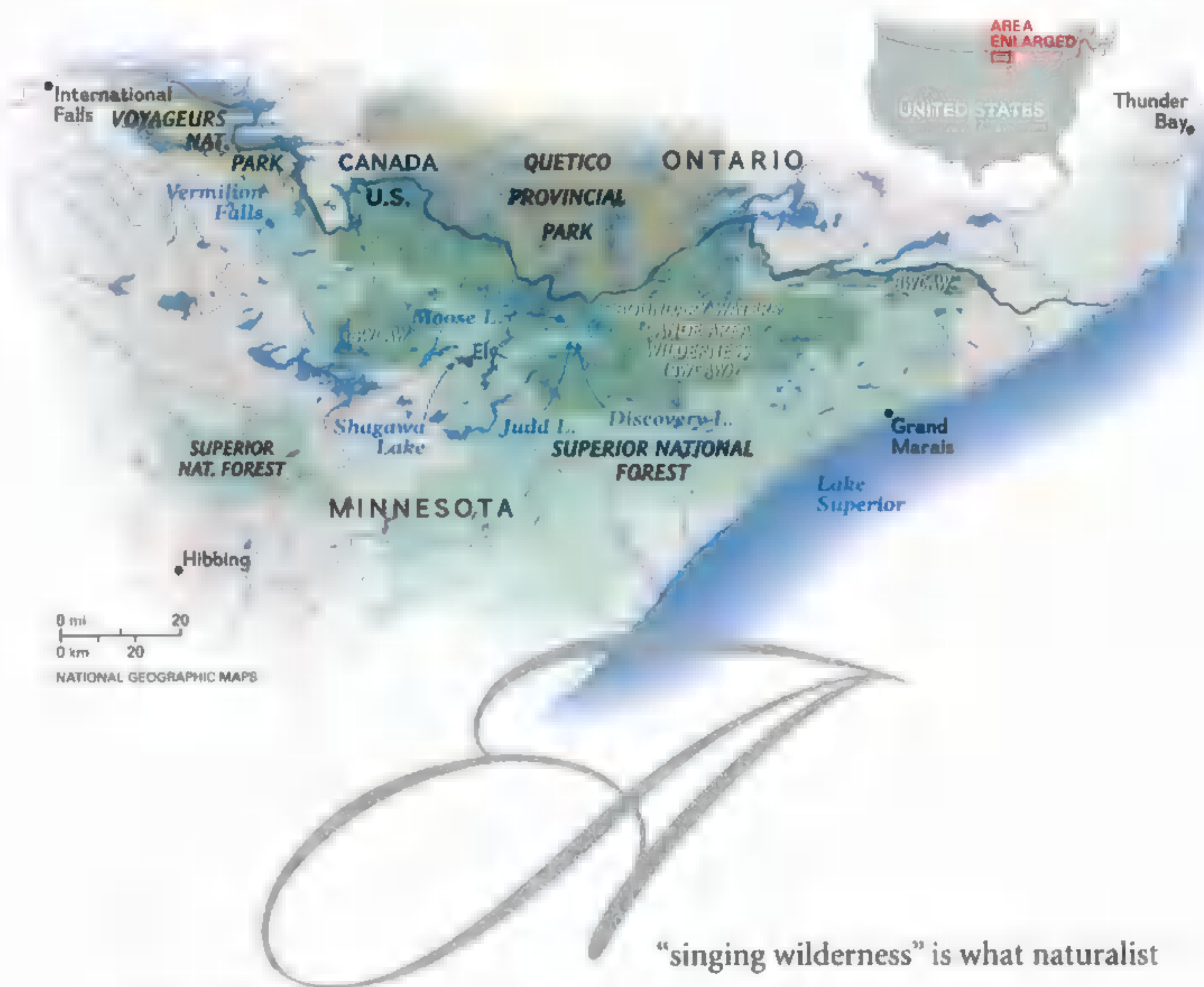
Waters

The voices at dusk on Shagawa Lake all flow from the wind that saws black spruce and pine, lifts osprey and gull, and cuffs the chill water. This wilderness border of Minnesota and Canada is my backyard. One summer I set out to know it better.





*M*oloes killed the moose three or four years ago. Now porcupines and squirrels gnaw its bleached antlers for calcium, and birds swoop in to hunt for insects. But what's attracting this gray jay is me. This mischievous yet trusting bird seems innately drawn to humans, knowing we might have food. It's clever, like its cousin the raven, who leans to the opposite temperament, shy and suspicious. Night had almost fallen when I saw a raven's calling card adrift on a pond (above).



“singing wilderness” is what naturalist Sigurd Olson found when he wandered the Boundary Waters region, the expanse of forest and lakes embracing the Minnesota-Ontario border. Here was a land quiet enough that he could hear the natural world speak, a place that offered the renewing moments of peace “when we feel and are aware with our entire beings rather than our senses.” It’s a song of silence he felt we’re all listening for, whether we know it or not, the way “sick animals look for healing herbs.”

Before Sig died, old and wise, in 1982, I was fortunate to spend time with him walking these woods and canoeing these lakes. It’s in no small part because of Sig that more than a million acres of Superior National Forest were given greater protection in 1978 as the Boundary Waters Canoe Area Wilderness. He’d been fighting since the 1920s to keep it free of roads, dams, airplanes, and—in the most pitched battle—boat motors. For his intractable stance on that issue, Sig was hanged in effigy in his town of Ely. Canoe versus motor still churns today, and in the interest of ensuring domestic tranquillity, motors are allowed on a few of the wilderness area’s lakes.

I live 20 miles east of Ely, my land surrounded by the national forest and brushing against the wilderness area. There isn’t a month when it hasn’t, in one year or another,




snowed. I love the purifying snows of winter. Then spring comes creeping, and thousands of island-dotted lakes begin to absorb their thick skins of ice, and there's a transformation so intense that I have the impression of traveling a long distance, without leaving home. Seemingly overnight, it's summer. The explosion of summer in this latitude begs to be inspected every day, or events will be missed.

So I decided to photograph every day of it. From June's summer solstice, when the light stretches from 4:30 a.m. to 9:30 p.m., to September's autumnal equinox—93 days I sought it out, taking in all that a day delivered. I traveled from Uncle Judd's Creek, which tumbles into a waterfall just outside my window, up into the lakes of Canada's Quetico. The gift of a misty July morning was a great blue heron crowning a black spruce (above). Yes, there were days wretched with black flies and mosquitoes, but those mosquitoes pollinate our glorious orchids, and I'm sure the flies have a higher calling too.

Sig Olson understood that “without stillness there can be no knowing.” Once you've experienced the singing wilderness—here or wherever the natural world reigns, you can carry it with you to the noisiest city. As Sig wrote in my copy of one of his books: “May you be somewhere where the singing can be heard.”

WEBSITE EXCLUSIVE

Find Boundary Waters travel tips at nationalgeographic.com/ngm/0306 and link to Jim Brandenburg's portfolio. His book *Looking for the Summer* appears this fall.



Summer starts long before its first day, of course, but that's the morning a wild rose flirted with me on the shore of Discovery Lake (bottom right). As lakes warm, white water lilies rise, petals wide in the morning, then closing as day fades. Fireweed blossoms measure the summer's passage, blooming progressively higher on the stalk (below). At Moose Lake there's a grove of birches (right) that dance in my mind like spirits of Ojibwa canoes.







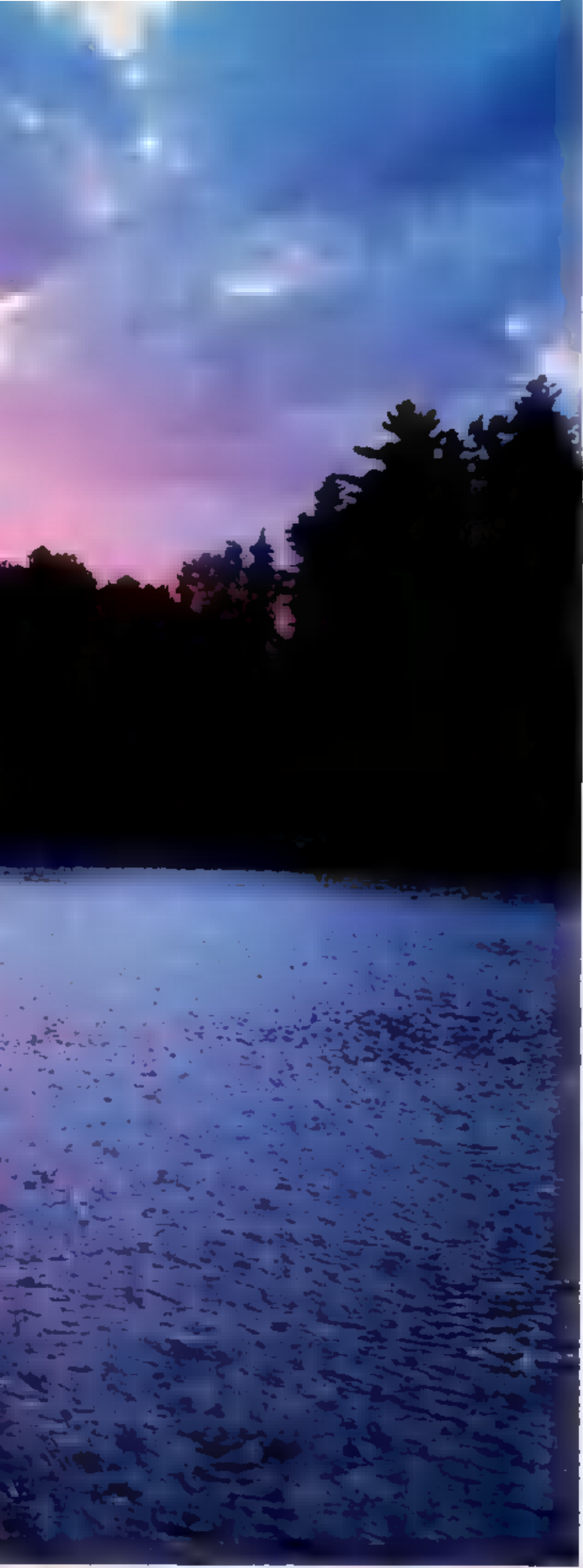
When its basking days yield to five months of solid ice, a painted turtle will



hibernate in the muddy lake bottom, buried among roots of yellow water lilies.



The thunderstorm came up quickly on a late August evening and just as swiftly was gone (above). Standing here on the shore of Judd Lake, I have heard the most evocative sounds in nature: the howling of timber wolves and the calling of loons. Minnesota is the only state in the lower 48 that has always sustained a large wolf population. I spent hours last December watching five wolves play on the surface of Judd Lake, liquid just two weeks before. Loons must live in water, so the state bird flies south before the freeze. A beaver dam created the lily pond where a loon glides between skeletons of black spruce (right).





Antlers budding, a white-tailed buck grazes a field of daisies. . . Neither would have



been seen here a hundred years ago, before logging chased woodland caribou north.

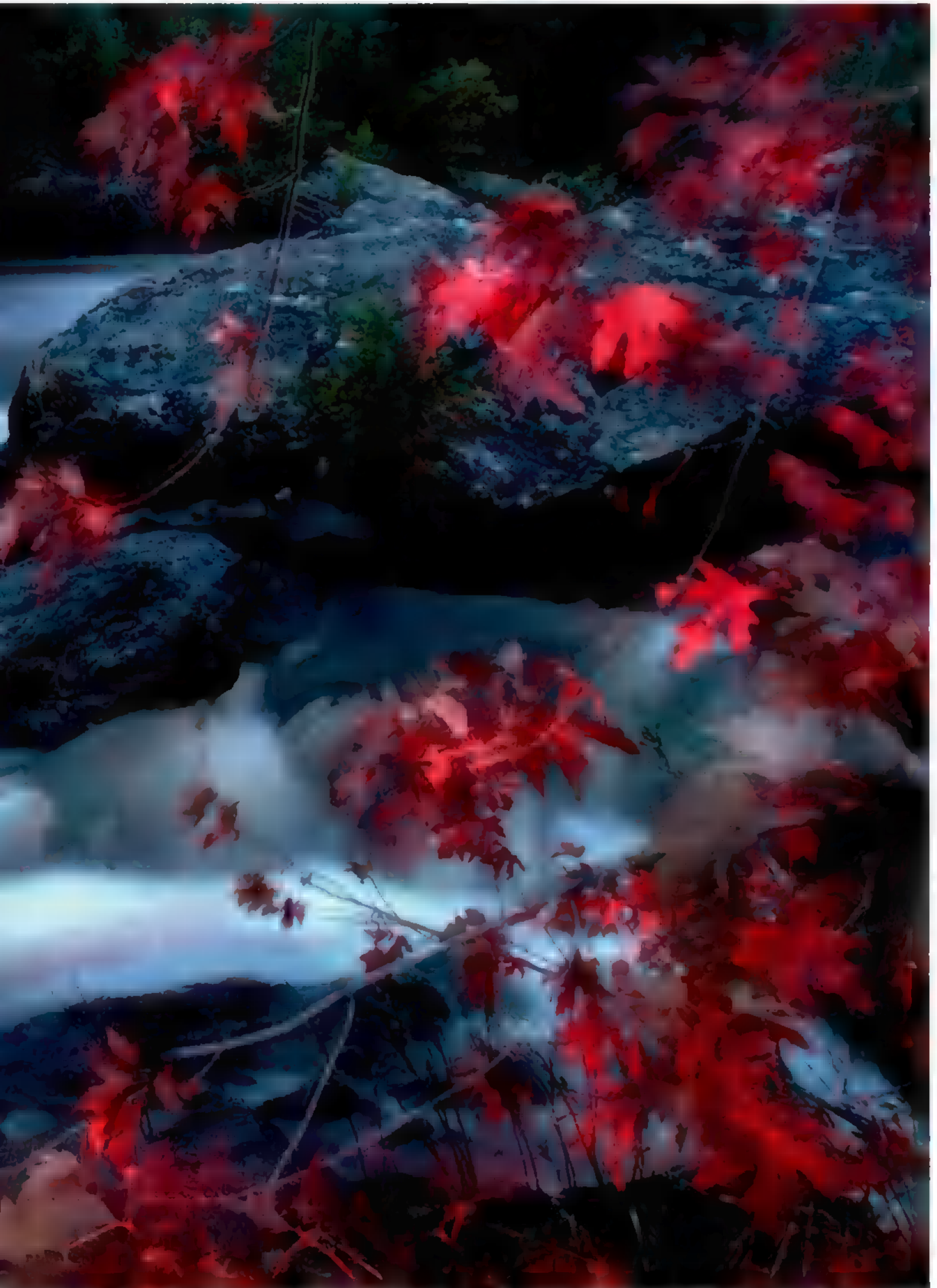


*B*ears?" a houseguest inquired. Not a worry, I said. Then at 5 a.m. this old guy used a canoe as a step stool and crashed through an unlocked kitchen window, drawn to our Fourth of July blueberry pie. He wasn't hard to chase off. I saw him again the next week as a bee—missing honey, no doubt—buzzed his grizzled mug. A young snowshoe hare (above) may not understand why she's been given feet as oversized as her ears, until she floats above snowdrifts in her winter white coat. That is, if her summer camouflage fools the silver fox (below).





September dawns with maples ablaze at Vermilion Falls near Voyageurs National



Park. Standing midstream on a rock, I keenly feel the wolf of winter stalking. □



Bandaid

before the bombs

EYE ON IRAQ PART ONE

This first report in our continuing coverage focuses on life inside the capital during the final countdown to war, from veteran NATIONAL GEOGRAPHIC photographer Alexandra Boulat.



March 5, 2003 Over the Line

Through a window, I saw this soldier, snapping the top of one of the city's many bottled sodas. Iraqis love to be photographed, but I'd already taken a whole roll of these guys, who seemed edgy as U.S. forces gathered on the Iraqi border.



March 22 Smoke Screen

Late this afternoon the Iraqis set fire to trenches full of oil to create a wall of black smoke around the city—hoping, I suppose, to blind U.S. bombers and confuse the guidance systems on cruise missiles. This tactic may or may not have worked, but it made a dramatic backdrop for the 14th of Ramadan Mosque.





January 30 Tarnished Tyrant

Today I visited an official sculpture studio, where I found Saddam Hussein riding a horse straight out of the Arabian Nights. In a city where no one feels free to criticize the government, the workers were worried about letting me photograph this statue, covered in dust and in need of repair.



EDITOR'S NOTE *Prowling the streets of Saddam Hussein's Baghdad in the mid-1980s, at the height of the Iran-Iraq War, NATIONAL GEOGRAPHIC staff writer William S. Ellis couldn't help noticing the city's seeming unconcern. "The front line of the fighting is less than a day's drive away, yet there is a heavy sense of well-being in this city," he wrote in the January 1985 issue. "The breath of war—that grim rale of agony—wafts here as something spent, like a sea wind too long upon the land."*

Until mid-March of this year, photographer Alexandra Boulat found an eerie similarity in Baghdad, even as the steely winds of war, grown to hurricane proportions, were bearing down on the Iraqi capital. Baghdad has seen such storms before, residents told Boulat. Even the government minders assigned to monitor her activities watched the coming war with an air of studied indifference. Yet Alexandra, as she has done so memorably for this magazine in Kosovo, Albania, and Indonesia, dug deeper, capturing not the military buildup to war, but the mood of the city's people.

As I write this in early April, hours before the magazine goes to press, Baghdad is in chaos. The statues of Saddam that Bill Ellis saw two decades ago are being dragged through the streets. And Alexandra is still there, still making photographs, continuing to document the unfolding events. I have no idea what Baghdad will look like on the day you read this story, or in the months and years ahead. But surely it will be a different place from what you see here. In the coming months NATIONAL GEOGRAPHIC will publish the rest of Alexandra's story, as this chapter of Middle Eastern history plays out. To help you understand what comes next, we offer this prologue in words and pictures—a snapshot of a city on the brink of war.

A Photographer's Journal

BY ALEXANDRA BOULAT

Palestine Hotel: March 19 The mood is so different today. People are scrambling to the shops to stock up on supplies. Families are packing, taping their windows, phoning overseas relatives one last time. Everyone in Baghdad knows war is about to crash down on them, but no one knows when. It's hard to sleep or think clearly. So you've got a city of five million people who are completely stressed out and sleep deprived. You can see it in their faces.

It's strange because even just last week, people were still trying to keep up a normal life, acting like nothing bad would happen. When I got here in January, I thought the Iraqis were in denial or maybe so hardened by past wars that they really weren't afraid. But after talking to people, I realized they thought the idea of foreigners invading their country was crazy. They simply





February 5 Watching Colin Powell at the UN

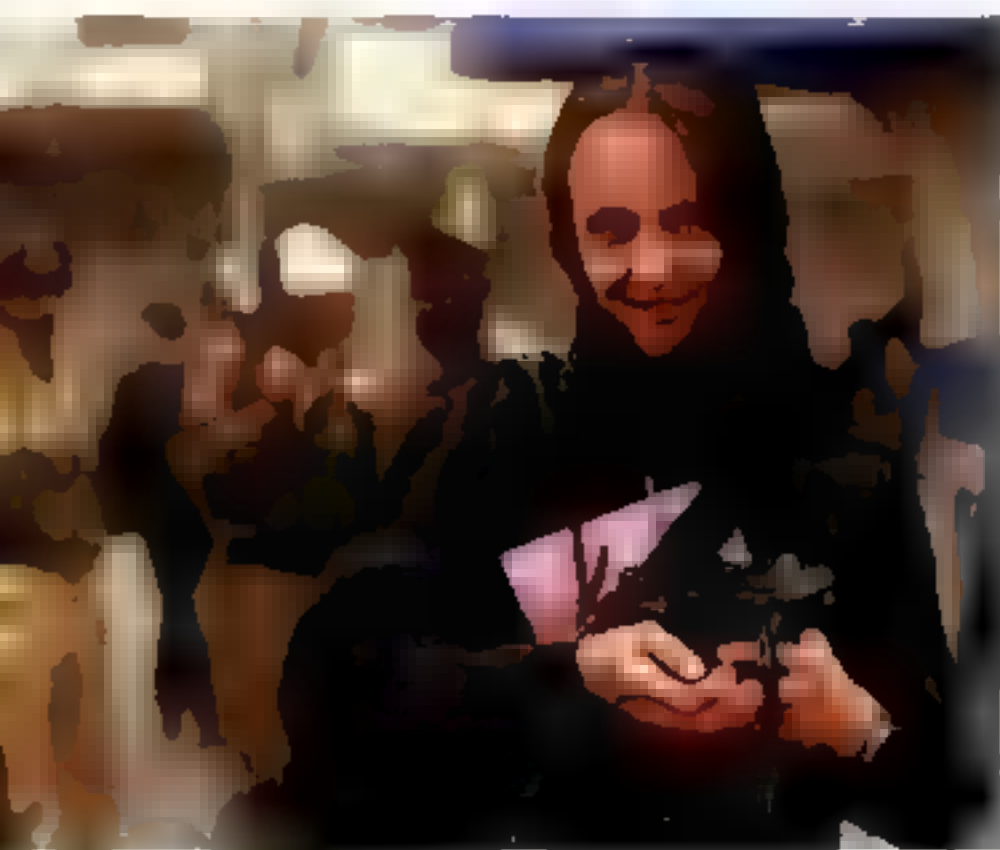


March 21 The second night of bombing



March 5 War Games

I've been surprised at the lack of military preparation in the city. But today I noticed a few sandbags piled on the streets, miniature fortresses built by the army in strategic locations like traffic circles. Kids couldn't resist playing in them and pretending to fight the Americans. While they were blasting away, I made mental notes of those intersections—good places to avoid once the real war begins.



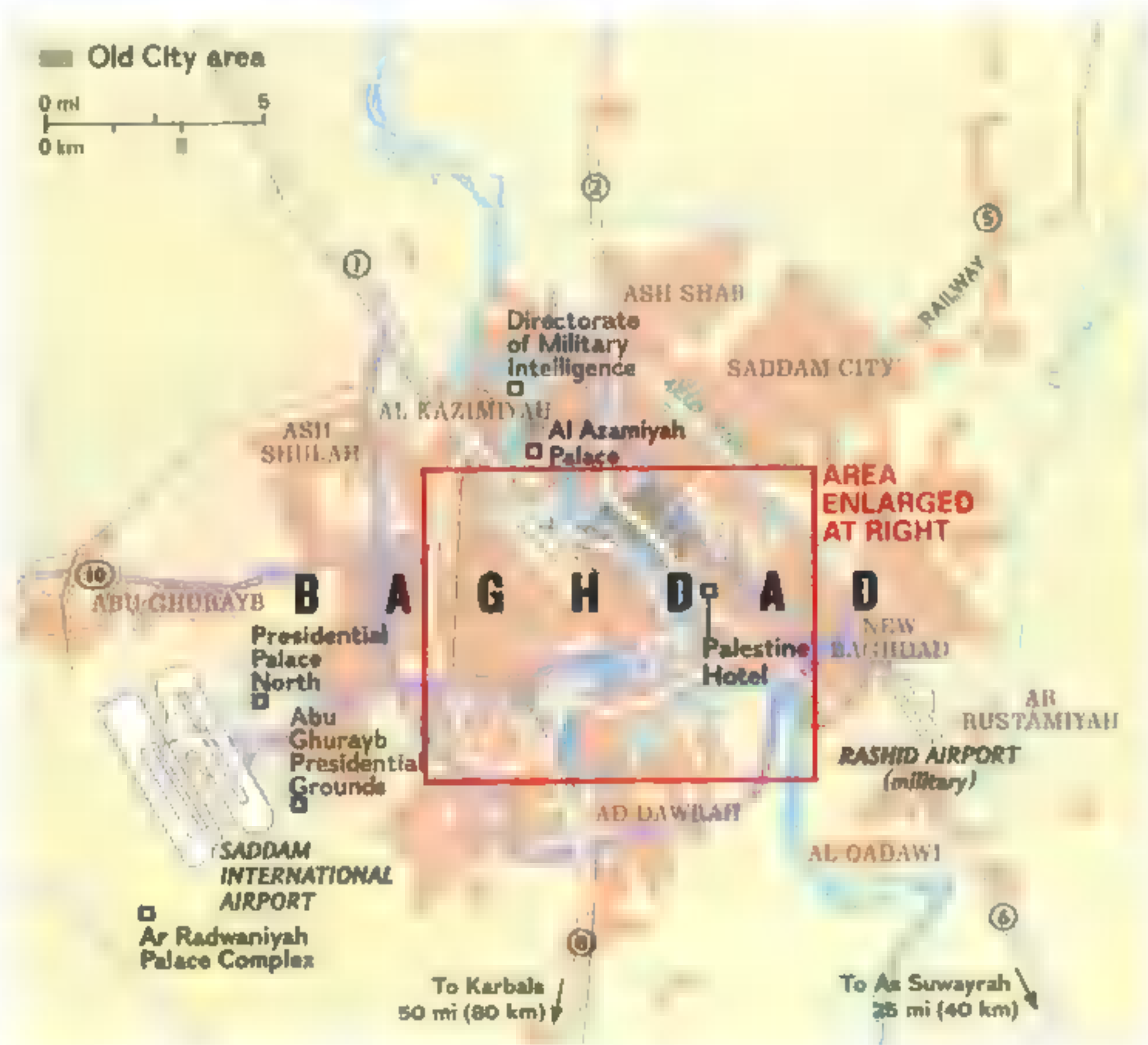
ALEXANDRA BOULAT BY JEROME DELAY

couldn't believe it might really happen. So people carried on as if everything was fine. Just a few weeks ago I went to a wedding celebration that lasted two days and no one talked of war. It seemed as if everyone in Baghdad was getting married, fussing over food and clothes, and spending a fortune. If I didn't know better, I'd have thought Iraq was on

holiday, with spring just around the corner.

Now suddenly soldiers are piling sandbags everywhere. Most journalists have pulled out, and who can blame them? But I've decided to stay. I've been traveling around Iraq for months looking for clues to what is real here in the lives of ordinary Iraqis. It's been difficult to figure out what people truly think and feel, made harder by the guys from Iraq's Ministry of Information who've been assigned to watch my every move. But I've been here long enough, and kept my profile low enough, that occasionally people relax and let their guard down.

Even now, on the eve of war, most of the Iraqis I talk to believe they will survive. I spent the other evening with a well-to-do woman whose villa was filled with art and antiques. She has decided not to leave Baghdad. To protect her belongings against any damage, she had packed up most of her furniture. But the next morning she woke up in her empty house and felt so depressed that she unpacked everything. She says she's not worried about the war, but about what will happen afterward. Who will rule Iraq? Will there be a civil war? What will be left standing? Will Iraq survive as a country? These are the biggest questions of all, and no one here can answer them.



WEBSITE EXCLUSIVE

For more of Alexandra Boulat's ongoing coverage of Iraq—including images and audio reports from the field—go to nationalgeographic.com/ngm/0306. You can also download high-resolution printable versions of our Baghdad maps, find a listing of resources and related links, and share your thoughts about Iraq's future on our Forum board.



Baghdad on the Brink of War

Home to five million people and sprawling over 280 square miles, Iraq's capital has roots in the earliest ages of civilization. Yet its center was shaped in just four years, beginning in A.D. 762, when the Abbasid Caliph had 100,000 workers build a "city of peace" on

the Tigris River. Baghdad prospered as a crossroads of the caravan trade in the eighth and ninth centuries; culture and scholarship flourished, raising the city to the pinnacle of Islamic civilization. Conquered by the Mongols in 1258, Baghdad waned and later

declined under the Ottoman Empire. Stewarded by Britain after World War I, it became capital of an independent Iraq in 1932. After the Baath Party took control in 1968, the ancient city of peace became the centerpiece of Saddam Hussein's Iraq—a once proud city laid low by fear and war.



March 13 Feeding the Poor

Early this morning I followed a crowd of Shiites distributing food to the poor in observance of a special day in Muharram, the first month of the Muslim year. My guide asked why I was in such a hurry to get these shots, noting that this food distribution would continue throughout the month. I felt bad telling her what was painfully obvious to me: With war only days away, even the rich may soon go hungry.

Shaima's wedding is today, and her father's house is in an uproar. The men have gone out, and I've stayed behind with the women to get ready. The bride is styling the hair of her young niece, the maid of honor. Spending so much money on a wedding right before a war seems absurd, but Shaima's family, like many, clings to a normal life. As one Iraqi told me, "Live today as if tomorrow doesn't exist."



March 3 Wedding Before War



Today the Iraqis forgot about their problems. It was Id al-Adha, the Muslim holiday marking the end of the hajj season, and everyone was out celebrating. In a poor part of town I found a group of kids having fun in what passes for a playground, getting their fancy clothes all dirty. It's tragic to think that, war or no war, one in eight children in Iraq do not live to see their fifth birthday.

Stuck in traffic this afternoon, I came across a wedding procession on its way from the bride's home to a fancy downtown hotel, serenaded by the musicians hired to accompany them. Soon the marriage season that precedes Muharram will end, but now people are busy getting married. Wedding cars wind through Baghdad, blasting happy music into streets that may soon turn sad.

February 10 Traffic Jam





March 12 Iraqi Jihad

I was taken to photograph a hundred or so foreign Arab fighters at a military training camp south of Baghdad. These guys were training as *mujahidin* to fight alongside Iraqi soldiers. Saddam is a secular leader and a less than devout Muslim, but that hasn't stopped him from trying to mobilize the Muslim world for a jihad, or holy war—and a rerun of the Afghan conflict with the Soviet Union.





It's become a cliché to show cloaked Muslim women in contrast to images of Western culture. Still, I never cease to be surprised by how modern Baghdad is, how in step with recent trends in music, movies, fashion, and sports, considering it's been under UN embargo for 12 years. Shopkeepers here seem educated about the West—but also keenly aware of their city's ancient heritage.

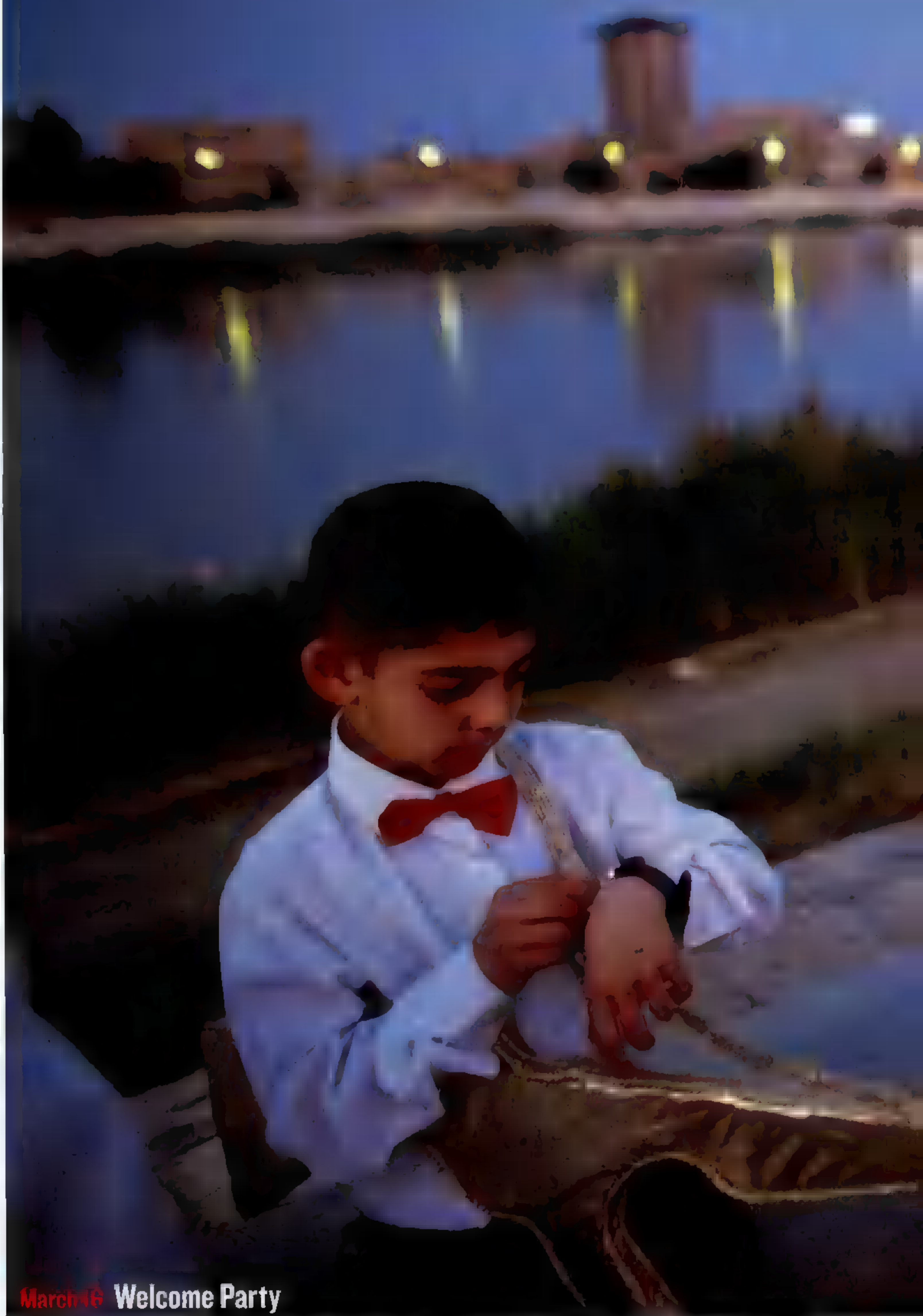
I had dinner with art gallery owner Samira Abdulwahab, right, and her daughter-in-law ■ their home in a wealthy Baghdad suburb. Charming and open-minded, Samira is one of the elite Iraqis who've done well under the current regime. But despite the warm lighting and cozy sofas, the mood was tense. Samira found it hard to make small talk and was consumed with worry. She feared her world was about to end.





March 15 Rally Around Saddam

This morning I witnessed a pro-Saddam demonstration in the district of al Mansur, which was flooded with middle-class protesters chanting "Down, down Bush!" and "Victory Saddam!" Thousands of people attended the five-hour rally, including gun-toting secretaries (above) and students bused in by government officials. My guide's 15-year-old daughter saw the rally as an adventure, although her interest seemed more social than political.



March 16 Welcome Party

Armed with make-believe Kalashnikovs, a group of Baghdad schoolboys waited beside the Tigris River to greet a busload of foreign peace activists who'd volunteered to come to Baghdad as human shields. Like actors in a play, the boys sang pro-Saddam songs in a little parade. The whole scene seemed pathetic—and futile given the breakdown of diplomacy. On March 17th President Bush announced that Saddam had 48 hours to leave Iraq. □





Each summer scores of **harbor porpoises**
are trapped in Canadian herring weirs.
Now, with the help of scientists and local
● fishermen, they're ●

Swimming



to Safety

Text and photographs by BILL CURTSINGER

An odd thing happens when a harbor porpoise swims into a net. It doesn't spin like a shark or fight like a tuna. It calmly and quietly gives up.

That's not what I expected from a marine mammal that, in the wild, seems as highly strung as an Irish setter. But the North Atlantic's smallest and least studied cetacean is full of surprises. Hard to spot with their hand-size black dorsal fins, harbor porpoises are also fearful of boats and divers, making research and photography difficult. No underwater images exist of harbor porpoises in their natural habitat, though pictures of dead ones abound. In the early 1990s up to 3,000 a year drowned in the Gulf of Maine region, mostly in gill nets. A hundred or so also died in herring seines. That prompted Duke University biologist Andy Read (right, in yellow) to work with herring fishermen on Grand Manan Island to rescue the animals—and learn something about them in the bargain.





Though capable of six-minute dives to 600 feet, a stressed harbor porpoise can drown in seconds when snarled in a herring seine. To prevent this, rescue diver Dave Johnston (left) lugs a four-foot-long animal to the surface and a waiting skiff. Read's team then works fast to take blood samples and measurements, constantly monitoring the porpoise's pulse and respiration for signs of trouble.

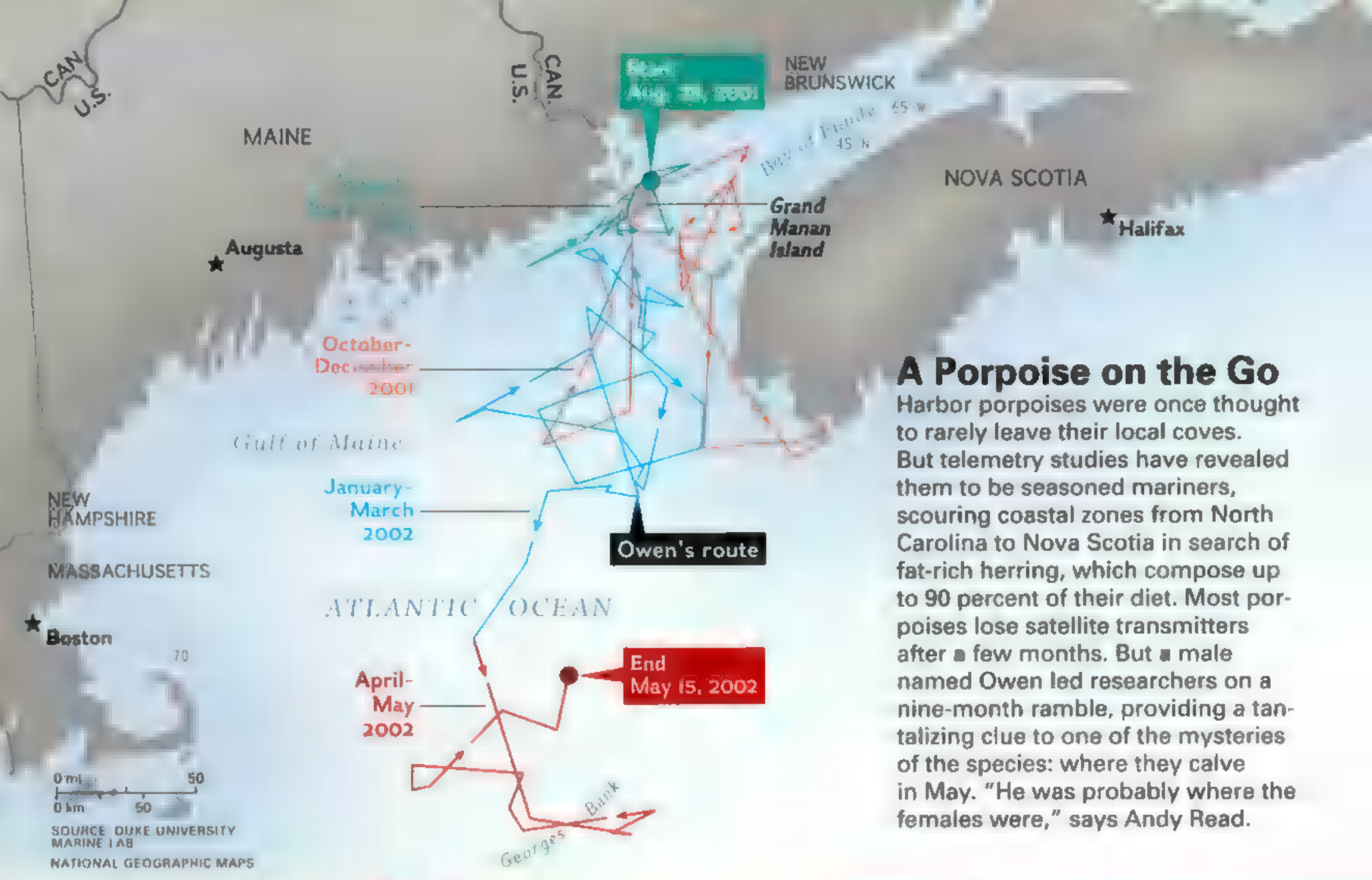


“Where there are herring, you’re gonna find those little porpoises,” Grand Manan fisherman Herbert Lambert told me, dispensing a bit of

local knowledge that has endured around the Bay of Fundy for centuries. Passamaquoddy and Micmac Indians caught herring in brush weirs and also ate harbor porpoises that preyed on the herring. Today’s porpoises are merely bycatch, a nuisance in modern weirs (above) and gill nets. Fence-like weirs can hold 20,000 dollars’ worth of herring and often a dozen porpoises or more. As fishermen seine out the catch (right), herring and porpoises jam into a roiling ball (below). “It’s a frightening environment for them,” says Andy Read, who started the rescue program in 1991. “There’s a lot of noise, and it’s the first time in their lives they’ve been restrained.” A decade ago most harbor porpoises trapped with the herring died. Now fishermen call Read’s team when they spot a porpoise in their weirs and head out in their boats to help free it. Fishermen are paid for their time, scientists get valuable data, and the survival rate has hit 95 percent. Thanks to such conservation efforts—and to a steep decline in gillnetting—population estimates in the Gulf of Maine have doubled in the past decade to nearly 90,000.





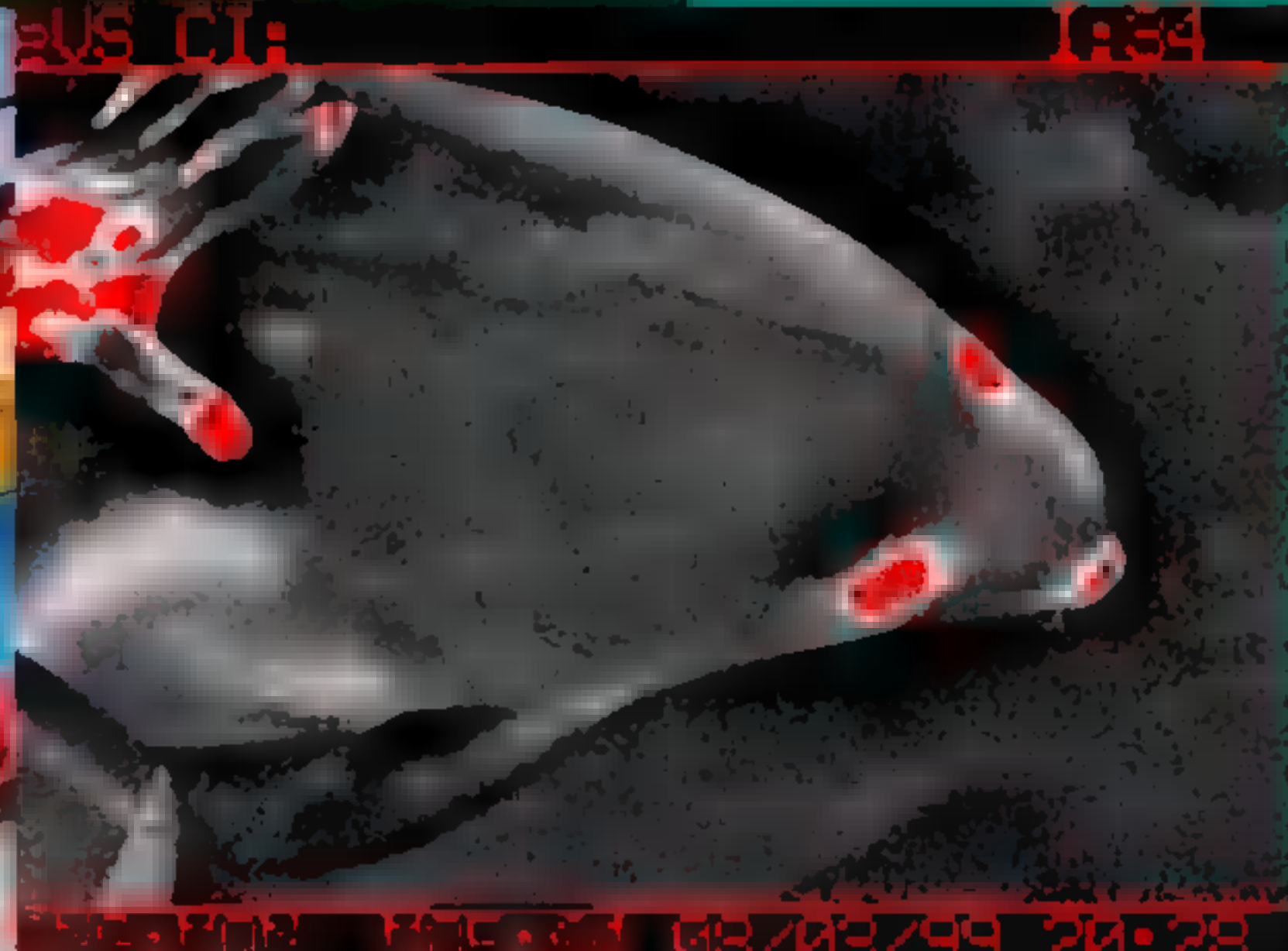


A Porpoise on the Go

Harbor porpoises were once thought to rarely leave their local coves. But telemetry studies have revealed them to be seasoned mariners, scouring coastal zones from North Carolina to Nova Scotia in search of fat-rich herring, which compose up to 90 percent of their diet. Most porpoises lose satellite transmitters after a few months. But a male named Owen led researchers on a nine-month ramble, providing a tantalizing clue to one of the mysteries of the species: where they calve in May. "He was probably where the females were," says Andy Read.



A harbor porpoise pulled from a weir is tagged and released (left and right). Some get a \$2,500 satellite transmitter (lower left) that lets scientists track their movements. Thick blubber keeps the animals remarkably well insulated. An infrared image reveals heat loss only around the blowhole, beak, and eye (in red below).



D. ANN PARST, UNIVERSITY OF NORTH CAROLINA AT WILMINGTON

**At one weir we found more porpoises
than the divers could handle.**


**I shed my cameras and dove
to one caught in the seine's folds,**

grabbed it, and hauled it over to the scientists' skiff. Working as smoothly as an Indy 500 pit crew, the researchers measured the length, weight, and girth, constantly bathing the porpoise in cold seawater. Most animals were tagged, and on some Read attached satellite-linked transmitters that recorded the porpoises' travels and dives for several months. One of these they named Owen, after my youngest son. I watched with pride as he darted off into the green water, and later I followed his progress on the Internet until his transmitter gave out. I imagine him making deep dives in the dark Atlantic, chasing silver walls of herring. I wonder what perils he'll encounter and if he'll enjoy a long and fruitful life, just as I wonder about my own 16-year-old son as he makes his first tentative tracks down Maine's highways with his new driver's license. Now if only I could stick a satellite tag on him. . . .

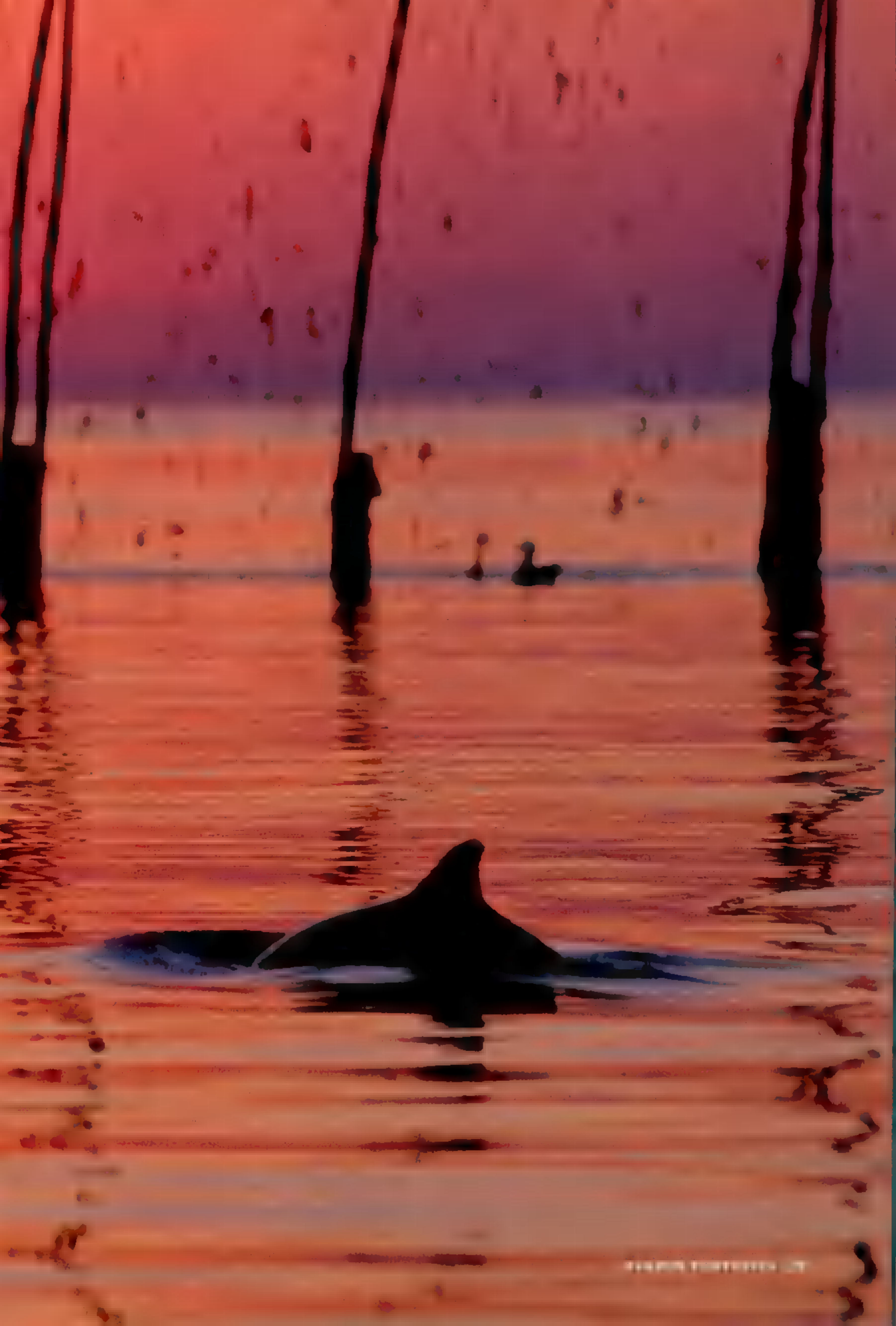
WEBSITE EXCLUSIVE

Want to learn more about harbor porpoises? You'll find photos, related websites, research notes, and tales from the field online at nationalgeographic.com/ngm/0306.





Normally hidden by the slightest waves, a harbor porpoise in a weir offers a rare glimpse on a glassy dawn off Grand Manan. Once traps, now ocean laboratories, weirs give researchers a chance to do good science—and a good deed. □



Peru's Long Haul

**HIGHWAY
TO RICHES,
OR RUIN?**

A treacherous span over Río San Gabán may soon give way to the Transoceanica, a controversial paved highway that would link the Atlantic—and Amazonia—to the Pacific. Many environmentalists are worried. Many Peruvians can't wait.



10
TONS

**PESO
MAXIMO
POR VEHICULO**



A dream of Peru's leaders since the 1950s, the Transoceanica consists of hundreds of miles of roadway, much of it unpaved. Crosses mark the human toll where trucks—de facto buses of the road—have gone over the edge. For passengers, fixing potholes is part of the fare.

BY TED CONOVER
PHOTOGRAPHS BY MARIA STENZEL

With a gasp of brakes, the truck nears the rickety, one-lane bridge on a hot Amazon afternoon. As it slows, the cloud of dust in its wake rolls toward the truck and then washes over it, enveloping the 17 people riding on top with fine red dirt. The truck is a *cisterna*—a tanker—carrying a load of fuel from Cusco up over the Andes and down to the Amazon Basin, but the top of the tank is flat, with low wooden rails around it. Up here, just above the large letters that warn *PELIGRO—COMBUSTIBLE* on the side of the tank, the passengers close their eyes and hold their breath.

Among them are Mary Luz Guerra and her son, Alex, 14, and while Alex seems to be enjoying himself, this is not Mary's idea of a good time. The nursery school teacher and single mother had flown from her home in Puerto Maldonado, in the rain forest, to Cusco, high in the Andes, to begin her month-long vacation and pick up Alex, who had been visiting relatives. The flight, full of tourists and a handful of more prosperous locals, had taken 37 minutes. On her return, however, she discovered the fare had risen, and she could not afford seats for both herself and Alex. So the two of them were forced to come home via the service entrance, as it were—a 72-hour trip atop this truck, on a narrow dirt road that curves like an earthworm held by the tail over a 15,585-foot pass and then down, down into the humid rain forest.

It's a memorable spectacle, falling from the

steep and wrinkled Andes into the endless, green, two-dimensional Amazon Basin. The truck stops for lunch in a settlement called Libertad. I join Mary, Alex, and some of the other passengers for a swim in a nearby creek; as I emerge, free of dust at last, a toucan bobs across an adjoining field and disappears into the forest canopy.

One of the two roadside restaurants is serving *paca*—a large rodent that is remarkably tasty fried. Mary sighs with disgust as another truck blows through town, and dust settles onto our plates. The truck belongs to a beer distributor making deliveries. When it pulls up next to us, I point out its logo to the others: Transoceanica. That word, shorthand for a proposed transcontinental highway, is all the rage here.

Mary dabs her forehead with a thin paper napkin. "I can't wait till they build that highway!" she says.


Like many in the developed world, I am enchanted by roadless places. The Earth has so few of them left, and glorious creatures like toucans depend on them. Many thoughtful people believe that the fate of the Earth itself depends on keeping nature unpaved.

But Peru is mad for new highways. Just as the north-south Pan-American Highway was the infrastructure project of the 20th century for South America, many people see an east-west Carretera Transoceanica—a road joining the Pacific to the Atlantic—as the project of the 21st.

One might assume that when people use a phrase like "transoceanic highway," they have







With her two children bundled at her feet, a Quechuan woman waits all day for a ride to Macusani, at 14,157 feet one of the highest towns in the world. Peruvians hope the new road will lead to jobs and a better life—a powerful draw in a nation where half still live in poverty.



Río Los Amigos snakes through a newly designated 340,000-acre conservation area, part of a chain of reserves that arguably contain the highest recorded biodiversity on Earth. Just across the border, rain forest becomes rangeland along Brazil's Transamazonia Highway. Three-quarters of the deforestation of the Brazilian Amazon has occurred within 30 miles of a paved highway.

a route in mind. But when I went to take a look at the future road, I discovered that wasn't necessarily so. The eastern part, everyone agrees, will pass through Brazil, which, as South America's economic powerhouse, has done a lot of paving already: Two or three of its highways are poised to connect the Atlantic to the Andes.

The future is murkier from the Andes west. One link, which may be finished first, reaches the Pacific via Bolivia. In Peru two main routes are being contemplated, but a third is a distinct possibility, and all have details that remain to be worked out. As much as "transoceanic highway" suggests something concrete to us, to Peruvians it also evokes a holy grail, an elusive public works project that has been talked about for years, but seems only to inch toward completion.

Which is not to say that people are blasé about it. Few appreciate this more than President Alejandro Toledo, whose administration—barely two weeks into his presidency, in August 2001—

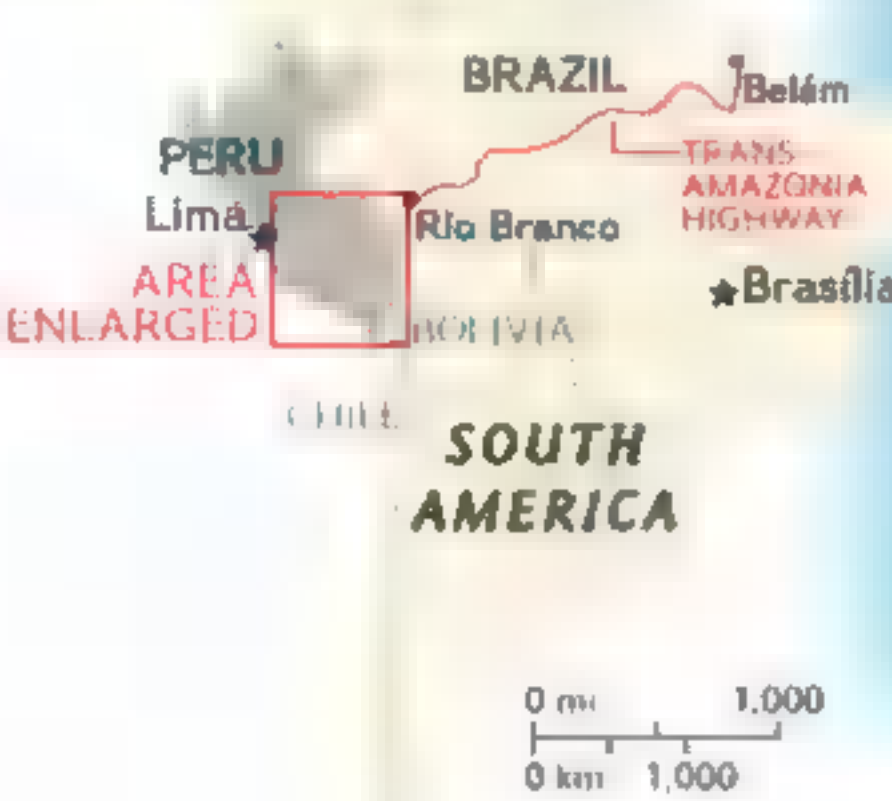
announced a study to decide the best route. There was an immediate uproar: Residents of both the state of Puno, next to Lake Titicaca, and its rival state of Cusco felt the study might ruin their chances of getting the road. Thirty thousand demonstrators shut down Cusco for a day, while in Puno, highway partisans battled police and held two legislators hostage.

Transportation Minister Luis Chang, trying to defuse matters, later said what experts have believed for years, that ultimately there will not be one route but many. And in fact gradual improvements are taking place all along these roads. But still untouched for the most part are the great passes over the Andes, and when that work will be finished is anyone's guess.

Cusco and Puno agree on one thing: The highway's route to the east of them will cut directly through the large piece of Amazonia that is the state of Madre de Dios. This causes environmentalists great concern. Cloud forests



Half of Peru lies in the Amazon Basin, yet only 5 percent of Peruvians live there. An all-weather road could change that dramatically. The states of Cusco and Puno are both lobbying to get the final leg of the highway. Either way, Amazon wood could reach Pacific ports in two days instead of a week.





During a 1990s gold rush, miners used existing dirt roads to haul a thousand earth-moving machines to the banks of Rio Huaypitae. A haphazard town soon sprang up. Its unlicensed strip mine ran for years, destroying 25,000 acres of rain forest and lacing the watershed with mercury.





Bars line the main street of Huaypetue, which grew to 15,000 people before the gold rush largely ended in 1998. Entrepreneurs like Eleanor Dea and family (right) now head up Río Las Piedras to harvest red gold: big-leaf mahogany.

in the mountainous western edge of this state, according to a Peruvian government study, have the greatest biodiversity of any place on Earth, and vast tracts of the rain forest below remain in pristine condition. This humid, verdant land is home to macaws, tapirs, and numerous tribes of indigenous people who remain uncontacted by the outside world. It is a place where the best roads traditionally have been rivers, which for millennia provided the least impeded access from one area to another.

Highways, of course, alter everything. They change patterns of human settlement, hasten the destruction of natural habitat, transmit disease, set the stage for clashes of cultures.

speaks the mountain language now, they replied, because so many people had come down to work. They themselves were headed up the river, to cut mahogany.

Mahogany wasn't always such a big deal here, Braulio explains as he gets back on the road and accelerates through several gears; in the late 1980s and '90s it took a backseat to gold. But since the plunge in world gold prices, the harvest of the wood has driven the economy of Madre de Dios. And with more than half the state federally protected—through biosphere reserves and conservation reserves—and another quarter owned by indigenous communities or Brazil nut harvesters, there is not a lot of legal

“One part of me wants it,” says a local innkeeper. “But another part knows it’s the beginning of the end.”

A dirt road already exists through Madre de Dios, and a transformation is under way. The driver of our tanker truck, curly haired, energetic Braulio Quispe Guevara, 35, has seen the change in his passengers. For 17 years he has hauled people and petrol over the Andes from Cusco to Puerto Maldonado and hauled people and wood back to Cusco. Many of his passengers are emigrants from the impoverished highlands. Amazonia is where the work is now, and mahogany is the reason.

A couple of hours outside Puerto Maldonado we pull over near Laberinto, a town on the giant Río Madre de Dios, to let off four young men. Earlier, I'd heard them speaking Quechua and asked about it. Everybody in the jungle

mahogany to go around. In their search for the tree, woodcutters invade the federal lands, where forests are full of illegal logging camps. Though the sale of this wood is illegal, the money involved is huge, and the few environmental enforcement officers in the area have proved easily corruptible.

We pull into Puerto Maldonado at dusk and stop across the street from the depot where Braulio will unload his fuel. It's the end of the line. I say goodbye to Mary and Alex—school started four days ago, so she's eager to get home—after helping load them into one of the three-wheeled moto-taxis that ply the city streets.

Though it's the capital of Madre de Dios, Puerto Maldonado has the dusty feel of a frontier





“You need to produce something the world really wants, and what the world really wants now is mahogany.”

town. Built at the confluence of two rivers, it has been a center for rubber tappers, Brazil nut harvesters, gold miners, and, now, loggers.

As in many such locales, there are only a handful of big players. I climb on the back of a motorcycle taxi one evening and go to ask one of the biggest, mill operator Alan Schipper Guerovitch, what he thinks of the proposed highway, and, incidentally, who is buying and cutting up all that illegal mahogany?

Schipper's mill sits on the edge of town, surrounded by wooden walls, with an observation tower that lends the impression of a stockade. Empty trucks idle outside. Passing my business card through a slot in the gate, I am admitted by guards and pointed toward the boss's office.

Schipper, 31, is blond and wears jeans and a polo shirt. Scion of a famous lumber family, he has a degree from Peru's leading forestry school. We sit at a massive table in a one-story house overlooking the open-air mill. The table, he

confirms, is made of solid mahogany, as are the giant doors, and the desks. He does not, he repeats several times, mill mahogany himself, and he doesn't know who does—too controversial, too much of a headache. Rather, the mill processes other red hardwoods: cedar, tornillo, and a tree called *shihuahuaco*.

The Transoceanica, Schipper asserts, could only be good for development. It would lower shipping costs and allow the wood to be brought to market much sooner and in better shape. Opposition to it is shortsighted, he feels, because it leaves his country in a position where there is “no way to develop, no possibility of growth.”

Referring to the chunk of Madre de Dios that is officially unavailable to logging, he says, “I ask you, what nation in the world can sustain its people on only 20 percent of its available resources? In a less developed country you need to produce something the world really wants, and what the world really wants now is mahogany.”



Heartwood of the rain forest, mahogany planks dry in the Río Cariyacu watershed, an area rife with illegal logging despite a crackdown. The planks, bundled into rafts (above) and floated to waiting trucks in Puerto Maldonado, are worth \$100 each on the river and \$1,500 at Lima. Peru's mahogany exports have risen twentyfold since 1991—most of it to U.S. furniture and coffin makers.

We leave the office so he can show me the mill. It is getting dark. A worker approaches Schipper, literally with his hat in his hand. "Please, sir, would you mind if I took some of those extra mahogany pieces?"

"Excuse me?"

"Some of that extra mahogany, by the gate."

"There is no mahogany by the gate!" his boss replies, glaring at him.

The man pauses for a moment, apparently not comprehending. "Yes, you know. That mahogany we cut."

"There is no mahogany. You can have some of that tornillo that's by the gate, if that's what you're thinking of."

"The tornillo?"

"Yes. That is all that's by the gate."

The man looks confused. I can see he is not bound for a management post. "Thank you, sir."

Much later Schipper would admit to me that he does mill mahogany "sometimes."

In a traffic circle across town a sculpture is rising, seven or eight stories high, resembling a tree trunk—a monument to biodiversity. As I pass it in a bus headed to a wilderness lodge, the guide next to me notes ruefully that this celebration of nature is made of concrete.

The contradiction mirrors others in Puerto Maldonado. A commercial town, it is also thick with offices of non-governmental organizations, including Conservation International, World Wildlife Fund, the Amazon Conservation Association, Pro Naturaleza, and the Frankfurt Zoological Society. Here one can find advocates of ecotourism and indigenous rights, of public health, river otters, and Brazil nut harvesters—scores of people worried about the advent of the highway.

I wanted to see firsthand the rain forest that they fear losing, and so got off the highway to visit Posada Amazonas, a lodge run by an ecotourism company in partnership with the



Carrying its load of cargo, a truck bound for a medicinal plant fair in Juliaca stops so passengers can adjust the load. Even unpaved, the road links people to local and global markets, moving everything from gold to herbal medicines and aphrodisiacs.





Fearful that the Transoceanica will intrude into their fields, farmers from Mataro Chico trail a federal highway engineer (above, second from right) as he measures the right-of-way of the soon-to-be-paved highway. Five months later not a disparaging word could be heard about the smooth new ribbon of asphalt, though livestock occasionally become roadkill.

indigenous Esa'ija community that controls the land. There, on a trip to the garden of a local healer, we learn of leaves that just might cure impotence, toothache, snakebite, and fright. The healer, Don José Mishaja, recently discovered a rare pair of nesting harpy eagles on his land and is negotiating with the ecotour company over tourist access to the nest. He wants a one-time fee of \$300. That seemed a reasonable plan for protecting wildlife.

Later we spend two hours at twilight atop a 115-foot-high tower that allows guests to experience the world above the forest canopy. My fellow visitors are all birders, and they help our guide identify a staggering array of winged creatures, from the fat and clumsy Spix's guans that crash through branches en masse, to a pair of scarlet macaws gorging on the fruit of a passion fruit tree, to the brilliant yellow-rumped caciques that soar by, and the white-throated toucan, one of the world's largest.

The lodge's administrator, Jorge Ricaurte, had just moved to the jungle from a job at the Lima Sheraton—huge cut in pay, he says, huge improvement in lifestyle. He has a background in biology but is also a part of urban modernity. What does he think about a new highway?

"One part of me wants it," he says, "the side that worries about food not getting through in the rainy season. But another part knows it's the beginning of the end."

Alfredo García, an anthropologist back in Puerto Maldonado, shares his concern. The costs of highway construction will go beyond environmental loss, he tells me. Indigenous peoples will suffer from disease, displacement, and acculturation. Black-market drug activity is likely to increase, along with prostitution and other social ills. Almost certainly, he fears, construction will precede the necessary planning for the highway.

García sighs the way some small-town



He walks down a new paved highway. He bends down, kisses his hand, and touches the pavement: Life is better now.

Americans do whenever they think of Los Angeles. “Just look at Brazil. That’s the future we’re worried about.”

From the air the road north to Brazil from Puerto Maldonado made me glad not to be on the ground: It looks wet down there, the jungle pressing close on the muddy track for mile after mile. There is evidence of recent road drainage projects, and a new bridge at the town of Iberia, but otherwise the route to the border looks neglected on Peru’s side.

To arrive in Brazil from Peru is to feel the development calendar being moved ahead two or three decades. Not only does Brazil have two roads under construction to connect Peru with parts east, but it is here that the modern roadbuilding movement was challenged by Chico Mendes and his followers.

Mendes was a rubber tapper who witnessed the disruption wrought by the building of

Brazil’s highway BR-364 across parts of Acre state in the 1970s. Awarded many prizes by other countries for organizing peaceful resistance to roadbuilding, Mendes was murdered in 1988 on the order of two landowners.

Among the many results was the rise of a green political party in Brazil that has governed Acre for several years now. Governor Jorge Viana hopes to dissuade residents of the notion that deforestation is synonymous with civilization. One of his goals is to demonstrate that “development does not depend on the destruction of the forest but rather on its survival.”

This does not mean that Acre has stopped building roads, however. The first thing I notice, upon crossing the border in the air, is that the road from the town of Rio Branco is paved almost to the Peruvian border at Assis Brasil, and construction vehicles are massed for the final push. The second is that, unlike in Peru,

the forest recedes for hundreds of yards from either side of the highway, and sometimes for miles, having yielded to logging and ranches; cattle scatter under our low-flying plane. Ten percent of Acre is now deforested, though more than 30 percent is also now protected, in conservation areas such as the 2.4-million-acre Chico Mendes Extractive Reserve.

In Rio Branco, I ask the state's secretary of science, technology, and the environment how continued roadbuilding squares with the administration's green goals. "In Acre we are very far from anything," Carlos Edegard de Deus explains; one of the state's only strategic advantages is its location "on the border of countries with access to Pacific markets."

Linking to the Pacific is so important that Brazil has offered Peru help in financing the Transoceanica. The goal, the secretary says, is to export to Asia: beef, forest products—especially wood—soy beans, and, down the road, manufactured goods.

And, he says, roadbuilding could actually enhance environmental protection. The idea

down, kisses his hand, and touches the new pavement: Life is better now, he says.

I had arrived in Puerto Maldonado via Cusco—one of the proposed routes for the Transoceanica. A competitive route crosses the mountains south of Cusco and links to the coast a different way, via the town of Puno. That's the way I wanted to go back.

It's the more direct connection—750 miles, compared with about 1,000 for the Cusco route. But parts of the road are much worse, only half of it is paved, and there is correspondingly less traffic. I leave Puerto Maldonado for Masuco, in the foothills, and after two days find myself atop a truckload of mahogany.

The driver is on top of the truck fairly often, as well, leaving the wheel to his assistant while he flirts with two Indian sisters who are among the passengers, or looks for spare tires, or wakes us at 2 a.m. to say we'd better climb down—the truck was stuck in mud and had nearly tipped over. None of the passengers carry much food, nor adequate clothing for

Many thoughtful people believe that the fate of the Earth itself depends on keeping nature unpaved.

here, voiced to me by other conservationists as well, is that mahogany smugglers often have knowledge about trails and back roads that police do not.

I ask Joaquín Vial, a Chilean who was once his country's budget director and later directed the Andean Competitiveness Project at Harvard's Center for International Development, about the idea that roads can help in managing conservation areas. "Well, maybe," he says, with a laugh. "But every new highway I ever saw back home, the land around it was deforested [he snaps his fingers] like that."

The paving of streets in Rio Branco was proceeding at a fever pitch: Elections were coming up, and people hated their dusty dirt streets during the dry season. A government-produced campaign commercial featured an aging rubber tapper recalling how tough life was in the old days. Then he walks in the twilight down a new paved highway. He bends

the nights at 15,000-plus feet that lie ahead.

For the first two days the road is the worst I'd ever seen: a steep, winding, truck-trapping mudhole. Often we are stuck for hours on the steamy shoulder. At one of the longer delays 15 to 20 trucks are stacked up in either direction, waiting for one with a broken axle to be moved out of the way. As I watch workers tie a tow cable to the nearest truck, a mammoth iridescent blue morpho butterfly lands on my knee. Slowly I take my camera from my knapsack and photograph it. A moment or two later a very poor-looking man, a passenger on another truck, sits down next to me.

"You know, if the Shining Path had seen you doing that five or six years ago," he offers, unbidden, "they would have hung you up by that tree over there." His tone is not friendly.

"How about now?" I ask.

He shrugs.

The Maoist Shining Path guerrillas, I knew,



Llamas and alpacas once carried salt in caravans across Peru's high desert plain. Now they ride in style along this leg of the Transoceanica. "People crave roads," says Peruvian ecologist Enrique Ortiz. "They bring a sense of modernity, new goods, and the temptations of the modern world. But they can also break down communities and the environment. They change everything."

hated educated elites and had murdered thousands before being largely quashed in the '90s. But terrorists remain: A car bomb exploded in Lima the week before my arrival, killing ten. And two days ago we drove by a teenager, maybe 16, wearing a T-shirt emblazoned with the face of Osama bin Laden. Among other things, the incidents recall the extreme poverty of Peru, the alienation of huge numbers of people in the hinterlands. Desperation feeds political extremity; development that increases opportunity may be one cure.

I sit and watch the spectacle of the stuck truck. At first the driver refused to unload. But two attempts to pull him out failed when the pulling truck, itself, lost its traction. And now, with so many truckers waiting, he is under a lot of pressure. He and his assistants unload. They shovel mud and wedge branches under the wheels. I think about a comment by an economist who had wondered aloud to me why

Peruvians needed another big highway "when they can't even take care of the ones they've got."

The chubby, middle-aged driver emerges from under the cab, shirtless, wearing only one flip-flop, and covered head-to-toe in mud. But then, instead of having a heart attack from the stress, he sits down in the stream that runs across the road, laughs loudly, and starts splashing water over himself. It is no longer enough simply to watch. After he rinses, I join a score of other men and push while two trucks, linked by a cable, strain to pull the one truck from the mud. With a sucking sound, amid clouds of diesel smoke and the roar of engines, it is finally dragged clear.

I am filthy now too, and somehow that clarifies everything: These people, I thought, need a better road. □

WEBSITE EXCLUSIVE

How can the benefits and costs of a highway through Amazonia be balanced? Share your thoughts and find a photo gallery at nationalgeographic.com/ngm/0306.

flies

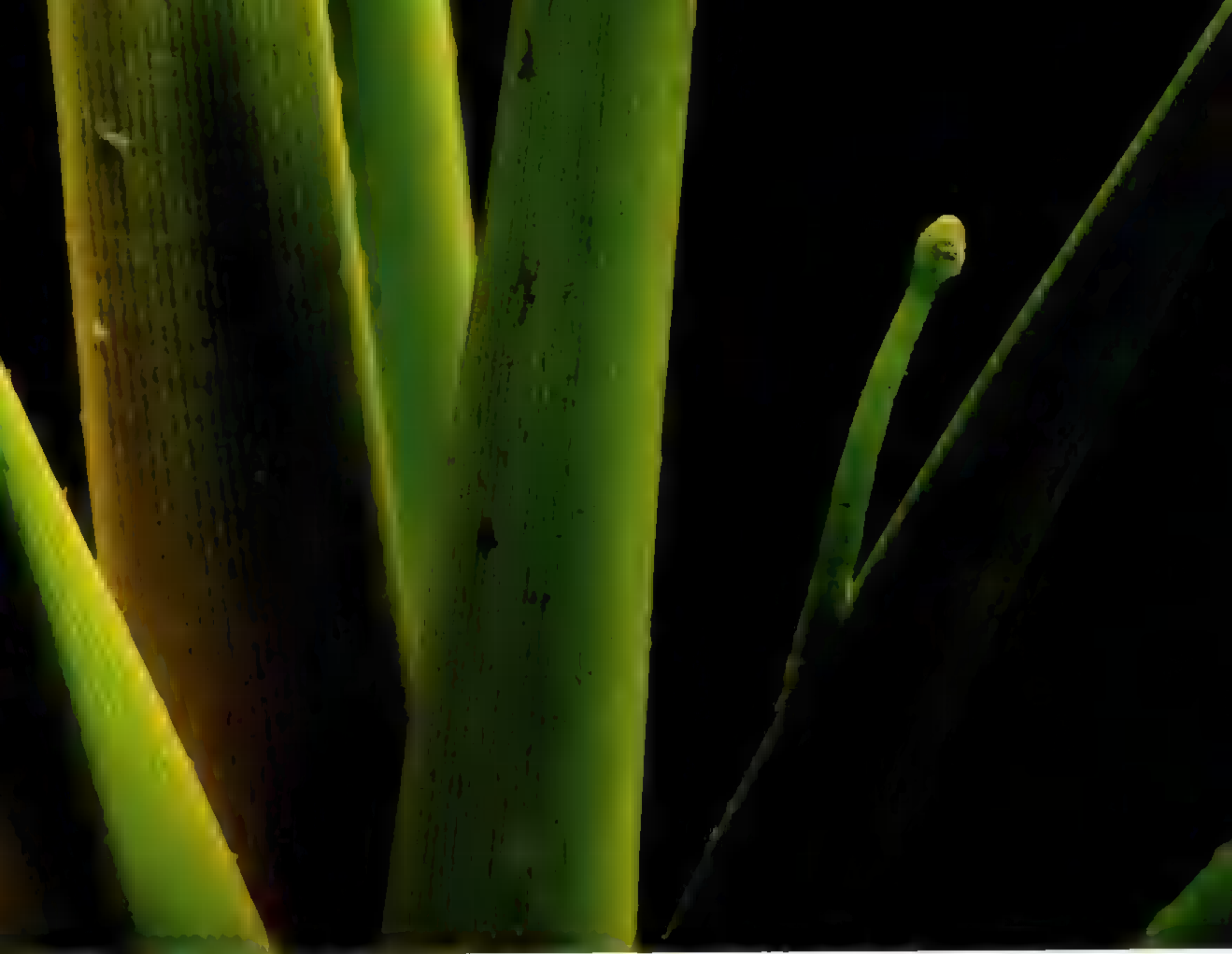
caterpillars

built
to eat
flesh





Lethal speed and an iron grip help this caterpillar—*an unnamed species of Eupithecia*—and devour a hairy fruit fly in Hawaii. Relatively rare, carnivorous caterpillars possess an arsenal of extraordinary adaptations to catch prey.



text and photographs by Darlyne A. Murawski

armor shields, seductive smells, artful camouflage—such are the physical and behavioral tools wielded by carnivorous caterpillars. In Hawaii they may hunt disguised as a bit of bark. In Denmark some live underground, pampered by ants. One Australian species invades green tree ant nests, devouring the brood. This craving for prey is highly unusual: Of the roughly 160,000 known butterfly and moth species, less than one percent eat meat, usually soft-bodied insects and spiders. Some begin life eating a specific type of plant, then switch to a particular species of insect. Such complex life cycles make these carnivores extremely hard to find—and vulnerable to extinction.


the silent ambush

Ready to strike, a lone inchworm (caterpillar of the *Eupithecia orichloris* moth) blends with a leaf of screw pine (left) on the Hawaiian island of Maui. Near its head six needle-tipped legs (right) can grab and deftly manipulate squirming prey. Sensitive hairs and nerves on the caterpillar's back detect the slightest touch of prey.

An unwitting termite brushes by. Snap! In one-twelfth of a second the caterpillar whips back and ensnares the termite, then methodically gobbles its meal (center). Belly full, it hangs languidly and finishes off the last bits while antennae on the termite's severed head twitch nearby (bottom).

All of Hawaii's 20 known species of *Eupithecia* blend imperceptibly into their surroundings. Some look like flecks of leaf litter, lichen, or moss. Though hundreds of species of *Eupithecia* exist all over the world, most feed exclusively on flowers and fruits. Hawaii is the only place where they live as carnivores—an intriguing twist of evolution.





Disguised as a twig, *Eupithecia staurophragma* nabs a lacewing at dusk on Maui. It strikes with a gymnastic backward twist, while strap-like prolegs keep it anchored as it grapples with fluttering prey. These carnivores can be picky, dropping prey that's too large, hard bodied, or distasteful to be worth the effort.



the enemy within

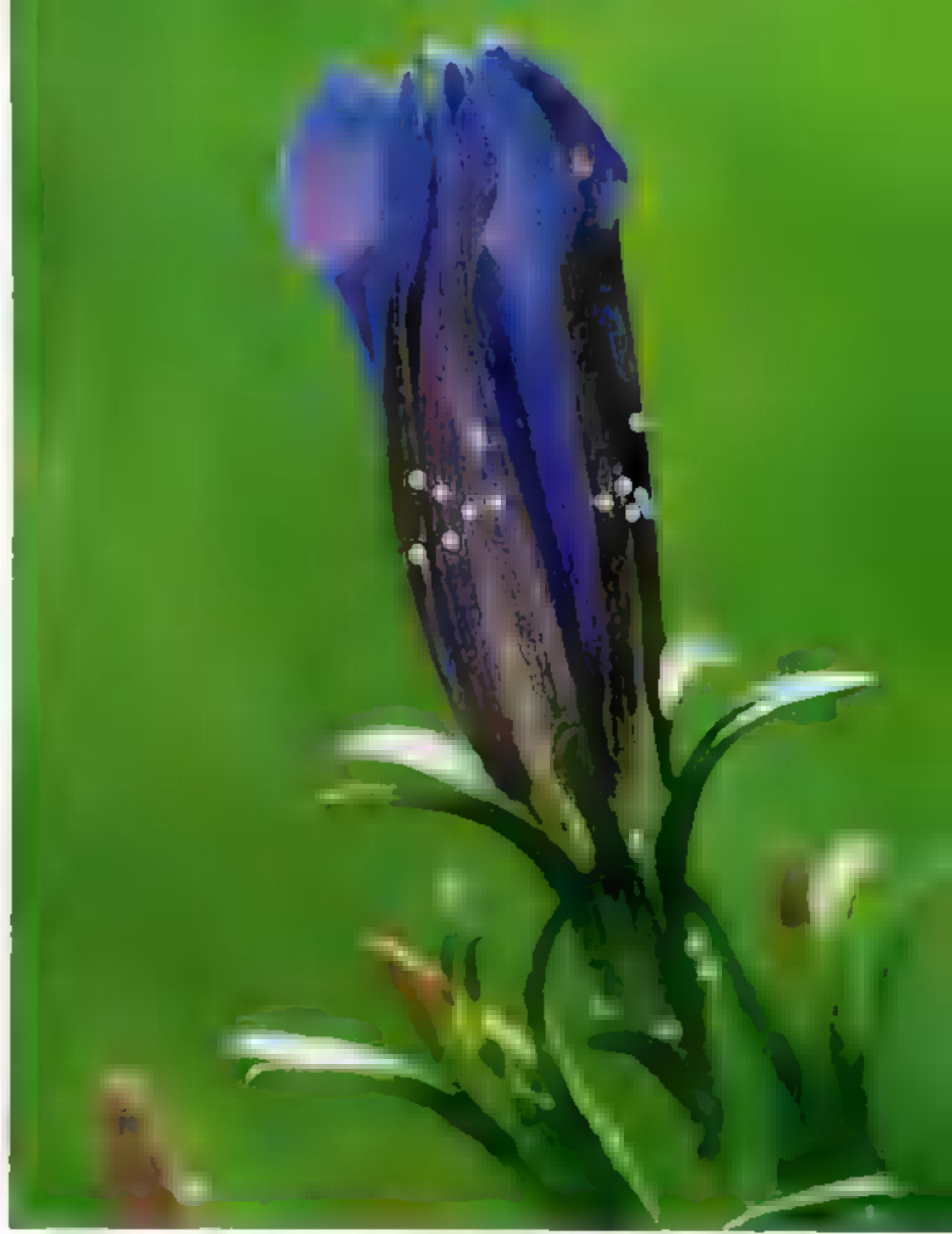
A reddish *Maculinea alcon* caterpillar (below) kills with impunity, eating a *Myrmica* ant larva while an adult ant placidly stands by, tending the nest. Rarely observed, this brazen feeding behavior originates with smell.

On the Danish island of Læsø the *Maculinea alcon* butterfly begins life as a tiny white egg on a marsh gentian (top right). After hatching, the caterpillar feeds on the flower for about two weeks before dropping to the ground. A



waxy coat of hydrocarbons on its body smells nearly identical to *Myrmica* ant larvae. Fooled by the smell, passing ants will mistake the caterpillar for one of their own and carry it into their nest. There they willingly feed it

regurgitated liquids mouth to mouth (center), a diet it supplements by eating the ants' brood. Once the caterpillar becomes a butterfly it must quickly flee the nest, spread its wings (bottom), and begin the cycle anew.





Built like a tank, the *Liphyra brassolis* caterpillar plunders green tree ant nests to consume their young. Seen through glass, it nibbles an ant larva gripped in its front legs. The caterpillar's leathery but flexible hide protects its soft underside from ant bites.





the cunning getaway

Escaping from angry ants has become an art for *Liphyra brassolis*. In caterpillar form this protected Australian butterfly feeds exclusively on the larvae of *Oecophylla smaragdina* ants. Once it emerges from its shield-like carapace, the adult butterfly is vulnerable to deadly attack by the ants, which can swarm and dismember intruders. Crawling for an exit from the ant nest, the butterfly sheds masses of white deciduous scales from its wing surface (left), antennae, and abdomen. The scales stick to the ants (top right), adding them to distraction. Only butterfly species that feed in ant nests have these deciduous scales, a remarkable adaptation. Once an escapee unfurls its wings to dry (right), it seeks a mate. Their eggs will be laid near a green tree ant nest, target of the next carnivorous generation. □

WEBSITE EXCLUSIVE

Hear the amplified thumps and grunts of *Maculinea alcon* caterpillars inside a *Myrmica* ant nest, and see more photos of predatory caterpillars at nationalgeographic.com/ngm/0306.





Siberia's Scythians
MASTERS
of **GOLD**

Barbarians of the ancient steppe? Not so fast.
A newly discovered 2,700-year-old tomb shows that
these notorious horsemen had a surprising
flair for graceful works of gold.



BY MIKE EDWARDS

Photographs by SISSE BRIMBERG



*F*irst they conquered the horse, then they conquered the land—a world stretching from central Europe to Siberia. One of history's earliest and mightiest horse-riding cultures, the Scythians revered

their mounts in life, death, and art. In this valley in Russia's Republic of Tuva, they left evidence of their reverence in the tomb of a noble couple.



Gilded by myth and metal, a Scythian couple survey a herd's procession. Their jewelry and effects—a rendering of goods found in the tomb—suggest royal heritage; other nearby burials



ART BY DONATO GIANCOLA

were far more modest. Hundreds of small boars (overleaf) found with the couple once adorned a quiver; Cypriots likely worshiped the creatures they depicted, including stags, fish, and mythological griffins.

From a pit twelve feet deep, Pavel Leus looked up at the three archaeologists standing on the rim. “Guys,” he declared, “we’ve got a problem. We need the police.”

Digging beneath a kurgan, or burial mound, in the Republic of Tuva, a little-known precinct of Siberia, Leus had just squinted into a log-walled vault. He saw two skeletons and the dim glow of gold. Lots of gold.

“First,” he later recalled, “I saw a gold *gorytus* [a combination quiver and bow case]. Then I looked another way and saw more gold.” There was a massive gold pectoral, or chest ornament (later weighed at 3.3 pounds); a smaller pectoral; two carved gold headdress pins, each about a foot long; gold-inlaid daggers; and a virtual carpet of other lustering metal.

A seasoned archaeologist—he had spent a dozen summers on Russian excavation teams—Leus had just become the first person in 2,700 years to look into this chamber, a royal tomb of the shadowy people we call Scythians. Nomads and fierce warriors, they lived in Central Asia as early as the ninth century B.C., and their culture spread westward to southern Russia and Ukraine, and even into Germany, before gradually disappearing early in the Christian era.

With Leus’s terse announcement, the expedition leader, Konstantin Chugunov of the State Hermitage Museum in St. Petersburg, dropped into the pit to have his own astonished squint between the logs of the chamber’s roof. He was quickly followed by his expedition partners, Hermann Parzinger and Anatoli Nagler of the German Archaeological Institute in Berlin. “My God!” Nagler exclaimed as he peered down. “You’re right. We need the police!”

In the Tuva Republic, a sparsely settled enclave of grasslands and snow-mantled peaks four time zones east of Moscow, the most common crime is cattle theft. Nevertheless, the archaeologists feared that anything might happen when word

got out that a fabulous treasure lay in an open pit in an empty sweep of countryside. Chugunov hurried off to the town of Turan, ten miles distant, to summon his friend Nikolai Bondarenko to guard the trove with a hunting rifle until round-the-clock police protection could be arranged.

During the next three weeks, while guards’ rifles bristled overhead, 44 pounds of gold was removed from the grave—far more than any archaeologist had ever found in a Siberian tomb.

A Scythian necropolis, the valley that holds this kurgan billows with scores of other burial mounds. Local people call it the Valley of the Tsars, as if all the mounds harbored kings. Some surely did.

Nearly all the kurgans are simple piles of earth, sometimes with a stone veneer. But four stand out because they are made entirely of stone. Chugunov, Parzinger, and Nagler chose as their target one of these,



which they dubbed Arzhan-2 (Arzhan is the name of a nearby village). Hundreds if not thousands of Scythians had labored to build it, quarrying sandstone slabs at the edge of the valley, hauling them several miles, and stacking them in a circle. Seven feet high and 90 yards across, it was a crown of thousands of tons of rock.

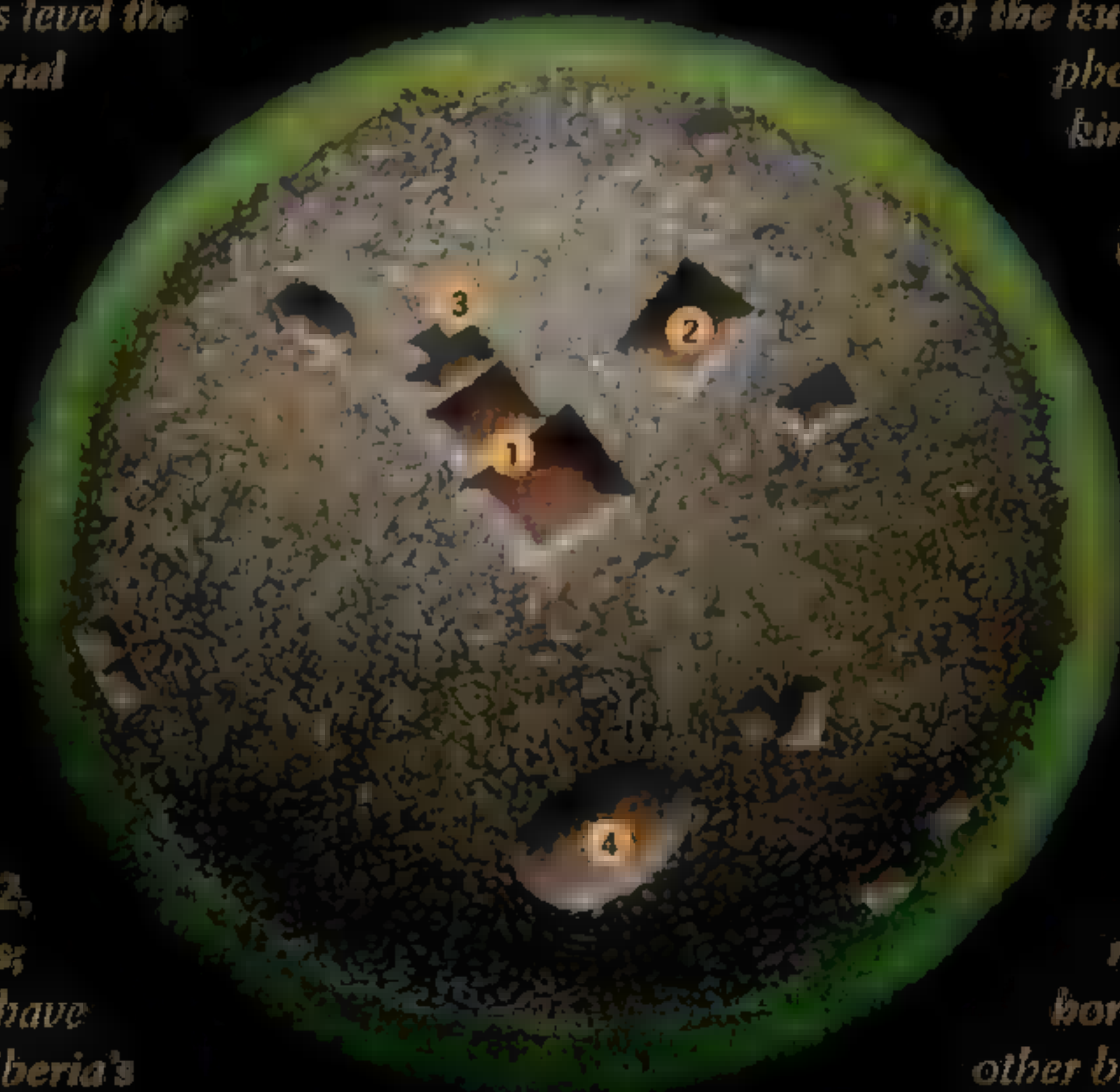
“I wasn’t really expecting to find a lot,” Chugunov later said. Archaeologists exploring Scythian burials know from sad experience that looters probably got there first, boring in, snatching gold and

(Continued on page 124)



Finding What Looters Missed

Trucks help workers level the football-field-size burial mound that Scythians made with sandstone from nearby cliffs. Scores of such mounds, called kurgans, dot Tuva's Valley of the Tsars, so named by locals for the kings thought to be buried here. In 2001 archaeologists began excavating this kurgan, dubbed Arzhan-2, with low expectations; looters over the ages have ransacked most of Siberia's Scythian tombs. At the center



Point of view of photograph above

of the kurgan (above, center of photo, and 1 left)—where kings were usually buried and looters usually looked—excavators indeed found nothing. But 45 feet from the center they hit the jackpot: an undisturbed wooden vault with two skeletons and 44 pounds of gold (2).

Elsewhere in the kurgan they found a grave with rare remnants of clothing (3), a horse grave (4), and many other burials—some Scythian, some from cultures of later times.





After 7 Centuries, Fresh Air

Two bodies were found under 12 feet of rock and soil, cocooned in a tomb of rot-resistant larch (above): a man in his forties, a woman ten years younger, both curled as if in sleep. Around them were thousands of gold ornaments and items for the afterlife, including an ax, whip, and bow and arrows for him; combs, jugs, and bowls for her. The first wave of excavation was done by muscle and shovel (below) and took a month. Once the tomb was opened, it took three weeks to document and remove the skeletons and artifacts (left). Everything is being stored at the State Hermitage Museum in St. Petersburg until a museum is built in Tuva.



What Scythians Wrought



TTruth comes to us from the past," said historian Carter Woodson, "like gold washed down from the mountains." With this discovery, truth literally comes in the form of gold—some 5,700 pieces of it. Plenty of gold has been found in Scythian tombs in Ukraine, but those pieces were produced in later centuries, either by or under the influence of the Greeks. These new pieces predate the others and display a uniquely Scythian style, indicating that Scythians were skilled goldsmiths well before they encountered the Greeks. Included in the cache: two neck pieces (right), a buckle from an arrow quiver (above), a headpiece ornament (below), and foil fish (top right) used to decorate a horse's bridle.





(Continued from page 118) jewels, and leaving all else—human remains, weapons, food for the afterlife—in a chaotic jumble. Indeed, a depression in Arzhan-2's center suggested that the kurgan had been violated centuries ago. "Looters always dug into the center," Parzinger said, "because if a king was buried beneath the kurgan, that's where his grave would be."

Systematically the archaeologists began removing rock from the kurgan's perimeter, slowly clearing a swath toward the center, the presumed jackpot. Presently they spied a slight indentation in the newly exposed earth. It was well short of the center, some 15 yards from it. Still, could it be a burial? They began to dig.

On the fourth day of digging Leus's shovel thumped against wood—the roof of the vault, made of decay-resistant larch logs. Switching to a trowel, he cleared the logs of earth. It was then that he glimpsed the most spectacular Scythian discovery in decades.

In all, there were some 5,700 gold pieces, not counting handfuls of beads. Most were small animal figures, particularly felines that resembled lions or possibly tigers, and also boars. These evidently had been sewed to the costumes

(which had not survived) of the man and woman whose skeletons lay side by side on the vault's floor. There were 431 beads of amber from the far-off Baltic, which must have reached Siberia as trade goods or booty. And 1,657 turquoise beads; arrowheads of bronze, bone, and iron; the remains of a bow; stone ceremonial dishes; and still other goods. "Even without the gold," Chugunov said, "this would have been an extremely valuable find." Radiocarbon dates placed the grave in the seventh century B.C.

Cascades of animal figures and beads lay close to the skeletons, as if both persons had been similarly adorned. "We don't know if the woman was a queen or a concubine," Parzinger said, "but since their ornaments were similar, both must have had high status."

Tests on the bones put the man's age at 40 to 45, the woman's at 30 to 35, at least a decade younger than the typical Scythian death ages. They were buried at the same time, meaning that in all probability she was sacrificed to join him in the afterlife. In male-dominated Scythian society it wouldn't have been the other way around. "Maybe she was poisoned," said Chugunov, "or maybe she chose to die to be with her husband."



Steeds for the Afterlife

As a draftsman records the scene, workers unearth the remains of 14 sacrificed horses (right). A measure of wealth on Earth and in the hereafter, horses were mainstays in many Scythian graves, often buried with bridles intact (below). This herd is modest—Scythian graves elsewhere have been found with hundreds of horses.





Last summer, in the second season of excavation, I watched day after day as the team cleared rock across the 90-yard width of the kurgan. I'm accustomed to seeing archaeologists wield small tools: trowels, knife blades, artist's brushes. But this job required muscle. Chugunov and company hired a hundred young laborers; pop music blaring from their radios was punctuated by the scrape of shovels and the thud of rocks heaved into dump trucks. As the kurgan diminished, a small mountain of spoil grew beside it.

Many more burials were discovered in the mound, some beneath the stone, some secreted within the slabs. At summer's end the total stood at 26. Amazingly, not one had been ransacked by looters. "In Siberia that's unique," said Chugunov. "Archaeologists have opened about 30 monumental kurgans like this one in Siberia, but never have we found a whole burial complex undisturbed."

From recovered grave objects the archaeologists concluded that half the burials were non-Scythian. Turkic nomads who began arriving in later centuries often chose existing kurgans as the final resting place of their own kin, burrowing shallowly into kurgan surfaces.

Scythian burials—Chugunov counts 12 plus the king's grave—were found in scattered sites beneath the kurgan's sprawl. Though not rich in goods, they contained clues to the quality of Scythian life in a time frame little known to scholars. Said archaeologist Nagler, "This may be the most informative of all the Scythian kurgans ever excavated."

RUTHLESS WARRIORS who used their victims' skulls as drinking cups—that's how the Greek historian Herodotus described Scythians. Most scholars believe they belonged to an Iranian language group. Though they left no written record, "from ancient sources we know the names of several

tribes, and they seem to be Iranian names," Parzinger said. "They were different groups, but they had the same way of life and similar burial customs." Thus, to scholars "Scythian" doesn't mean a united people but numerous tribes with a shared culture.

One of the major cultural markers is the depiction of animals in art. Fish tattoos have been found on the frozen bodies of Scythians in the so-called Pazyryk burials in the Altay Mountains southwest of Tuva, and the Arzhan-2 trove includes several golden fish. Moreover, Arzhan's thousands of small feline figures have counterparts in the lions depicted on some of the most exquisite Scythian ornaments ever found, in kurgans near the Black Sea. Scythians who flourished there in the fourth century B.C. were

in contact with Greek colonies (Herodotus may have learned about Scythians in travels to some of those colonies) and evidently the Scythians commissioned Greek



The Painstaking

smiths to fashion golden goods.

Twenty burial mounds rose within my gaze as I looked one evening across the Valley of the Tsars from a kurgan 25 feet high and ten miles from Arzhan-2. In Scythian times the valley must have teemed with horsemen and their flocks. The later Turkic arrivals, whose descendants are the largest group of Tuvans today, also pastured sheep, goats, and horses among the mounds. As recently as two decades ago there would have been many animals and probably several people in my sight, for state farms grew grain and kept large herds in the valley. But today the Valley of the Tsars is a lonely realm. With the collapse of the Soviet Union in 1991, nearly all the farms—heavily subsidized by the government—also foundered, and many residents moved away, abandoning hay mowers and plows to rust in the fields. On this evening I could see, far off, only one small band of cattle.



At the State Hermitage Museum, conservator Svetlana Burshneva works on an iron dagger from the Tuva site. The iron has totally mineralized, so Burshneva's task is to remove corrosion from the gold inlay without damaging

Art of Preservation

the dagger's core. "It takes a long time," she says. "We can't use chemicals because that might disturb the surface under the inlay." A broken poleax (below) must be reconstructed as well as cleaned, but a gold head-dress pin (left) finds its luster easily.



The valley's four stone kurgans stand in a row, each a mile or so from another. Chugunov, Parzinger, and Nagler speculate that they were built for successive rulers in a dynasty. Russian archaeologists opened one, named Arzhan-1, in 1971, and found it to date back to the end of the ninth century B.C. or the beginning of the eighth—one of the earliest known tombs in the entire Scythian world. Though it had been thoroughly looted, the archaeologists gleaned enough information to conclude that it must have been a royal burial complex, with the king's grave in the center.

At Arzhan-2 Chugunov and his partners puzzled over the off-center location of their fabulous discovery. Did it mean an even richer grave awaited at the core of the kurgan? Last summer the archaeologists dug into the center and discovered not one but two slight depressions in the earth, as if—could it be?—a pair of tombs awaited.

Diggers began to excavate one of the presumed graves. Six feet down, ten, twelve. Finally, bedrock. The pit was clean; nothing whatever had been buried in it. They turned to the second depression—and found another pristine hole. "We've never come across such a thing," said a baffled Chugunov. Parzinger speculated: "These holes may have been decoys to fool looters. Maybe the people knew looters always started to dig in the center and so they hid their ruler's grave to one side."

There might be other explanations, Chugunov acknowledged, but said, "If you accept the idea of decoy graves, it suggests that when the Scythians made this kurgan they were unsure of their future and whether the grave of their tsar could be preserved. Maybe some other group was threatening them. We know that at the end of the sixth century B.C. or the beginning of the fifth other tribes came into this territory." Who were they? Not the Turkic people who dwell in Tuva today; they arrived centuries later. Perhaps the early intruders were nomads from what is now central Kazakhstan or Iran, Chugunov said.

While pondering the mystery of the empty center, the archaeologists turned their attention to the lesser Scythian graves scattered in and beneath the rock. All the burials apparently took place at about the same time the king and his consort were interred. Several skeletons were adorned with jewelry that ordinary people would not have owned, such as gold earrings and a silver



choker. "These persons were related in some way to the nobility," Chugunov said. "In a royal kurgan like this one, no person was buried incidentally. Some might have been kin, others servants." Two men interred in graves at the kurgan's edge might have been guards.

I watched Chugunov and Leus excavate number 20, a double grave. Carefully they sliced earth away from the skeletons with knife blades. Leus uncovered a green smear. "Bronze—better than gold!" exclaimed Chugunov. Copper salts—the source of the green smear—help preserve organic material, he explained. Sure enough, a bit more blade work uncovered, along with bronze arrowheads and an ax, part of a leather belt and a tuft of wool felt, clinging to a fragment of a wooden ax handle. "So we learn that the ax was probably in a felt sheath," Chugunov said. "The belt probably held it at the waist."

Grave 13 was a formidable challenge. Day after day Svetlana Burshneva and Natalia Vasilyeva, conservators from the Hermitage Museum, worked on their knees to clean the three skeletons there, and to capture a trove of valuable information, for some of the garments of these persons—all women—had survived under a mantle of impervious clay. To my eye what was left of the clothing looked like bits of scorched paper or mats of fiber.

Around one skeleton Burshneva uncovered the remains of orange-colored cloth. Vasilyeva cleared the outline of a coat sleeve along a skeletal arm. "It was a fur coat," she pronounced. "Maybe deer." With tweezers, the conservators collected this friable stuff to take to the Hermitage's laboratories for analysis. Jewels and gold also came to light: Gold earrings were found beside one woman, and necklaces of turquoise,



Beneath the timeless motif of horses on the run, a Tuvan boy naps in a yurt. Siberian Scythians may have lived in similar dwellings, but no one knows; most details of their everyday life remain a mystery. They faded from the scene in the second century B.C., and their culture entered the realm of legend and artifact. Fortunately, some artifacts escaped the looters' grasp.

glass, and carnelian beads next to all three. One of them had been buried with a gold feline figure identical to those in the king's tomb, a clear sign that this grave contained someone linked to the royal family. "This grave will enable us to reconstruct Scythian costumes," Chugunov said. "That hasn't been possible for Scythian burials as old as the seventh century B.C."

And DNA tests on bones might prove that at least some of the persons buried in Arzhan-2 were blood kin, helping scholars understand relationships in a royal family. "We expect to get a lot of other information from the skeletons," Nagler declared. "Not just basic information such as sex and age; analyses can tell us about diet and diseases and whether there were periods of famine in a person's life."

Eventually, the gold from Arzhan-2 is to be turned over to the government of Tuva, once it

builds a museum in the capital, Kyzyl. For now, it resides in a safe in the Hermitage.

A MAJOR QUESTION: Who made the splendid gold pieces discovered at Arzhan-2? Because Greeks fashioned the famous Scythian gold ornaments found around the Black Sea, some scholars have concluded that Scythians had little artistic skill. Parzinger and Nagler presume, however, that the Arzhan-2 ornaments were created by Scythians who lived somewhere nearby. There's no evidence that other people, more advanced, lived in the region in the seventh century B.C. Nor did the opened graves contain evidence of contacts between Scythians and Greeks in that era. But, as Parzinger added, "It's hard to imagine that these fine pieces were made by nomads living in tents"—the way Scythians have usually been depicted. He believes settlements existed where non-nomadic craftsmen wrought gold objects. Chugunov noted, cautiously, that no remains of settlements have been found. Gold undoubtedly was at hand, however; in the Tuva Republic today, miners collect at least a ton a year by washing the gravel of mountain streams.

The ornaments of Arzhan-2 "exhibit workmanship of the highest quality," Nagler said. "The people were excellent craftsmen. This puts the Scythian quality of life in a new light. It rejects the stereotype that Scythians were just wild horsemen and warriors, migrating and destroying other people. They had a high level of cultural development." But isn't it true, I asked, that they fought and pillaged, as Herodotus wrote? "Yes," Nagler replied, "but so did other peoples with well developed cultures: the Egyptians, the Greeks, the Romans."

Indeed, it seems likely that Arzhan-2's trove of artifacts will inspire new thinking about the supposedly coarse warriors who once roamed much of Central Asia and eastern Europe. As for Tuva, "we didn't have a lot of information about the Scythians here," Chugunov said. "Tuva has always been an archaeological white spot."

Now it has a color: gold. □

WEBSITE EXCLUSIVE

Does digging into graves arouse the spirits of the dead? Read Mike Edwards's account of shamanism in Siberia at nationalgeographic.com/ngm/0306.

OAK BLUFFS, MASSACHUSETTS

Members of the Polar Bears club greet mornings with a cold dip at an Oak Bluffs beach often called the Inkwell by its mostly African-American visitors. Traditions like the a.m. workout run deep in this pocket of Martha's Vineyard.





02557

Ah, Summertime . . .

BY PERRY GARFINKEL PHOTOGRAPHS BY GARY WOLINSKY

OAK BLUFFS, MASSACHUSETTS



It's hard to know whether Martin Luther King, Jr.'s dream included a vision of this moment: to be standing on this deck on this Fourth of July in this town among these people.

But you have to think it did.

Part of King's dream, etched into the American conscience in that impassioned 1963 speech, was that his "four little children will one day live in a nation where they will not be judged by the color of their skin but by the content of their character."

And now, some 40 years later, at least from where I stand, it appears this dream is coming true.

Balancing a plate of pork ribs in one hand and a Cabernet in the other, I'm at a down-home but upscale Independence Day picnic in the town of Oak Bluffs, on the island of Martha's Vineyard. The guest list reads like a who's who of the best and brightest Americans of African descent. Judges and physicians, bank directors and university professors, painters and actors—an ingathering of extended family and close friends, all laughing, hugging, and talking kids, careers, and golf swings. Their welcoming spirit makes me feel as though I were a fixture among them.

Oak Bluffs wins over even the hardest of hearts with its multicolored gingerbread cottages and historic merry-go-round; its endless days of porch rocking, beach lolling, and clam digging; its cocktail parties, free gazebo concerts, and moonlit strolls up boisterous Circuit Avenue. But all this and a nearly prejudice-free atmosphere? How sweet this dream!

"People needed to know how deep black roots ran here," Carrie Tankard says, as she drives me around town, stopping at points of interest on the African American Heritage Trail of Martha's Vineyard, which she helped establish in 1997. "A Reverend John Saunders brought Methodism to the island in 1787," she begins. Saunders was among the first blacks to settle here. A century later, blacks were streaming to Oak Bluffs to attend summer revivals.

When they returned home, they told others of Oak Bluffs' natural beauty and of lucrative seasonal employment. These newcomers began to buy their own property. Their children would bring *their* children, and

Downtown Oak Bluffs divides the local park, foreground, from sailboat-dotted Oak Bluffs Harbor. Rooted in mid-1800s Methodist revivalism, the town has developed into a secular seaside resort popular with African Americans.



02557

PERMANENT RESIDENTS OF OAK BLUFFS: 3,700
PEAK SUMMER POPULATION: 20,000
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PAK BLUFFS, MASSACHUSETTS



Aglow with lanterns for Illumination Night, a 133-year-old festival of lights, Dorothy Burnham's gingerbread house is in a historically white part of town. Racial tension here is rare, says gallery owner Zita Cousens

(top right). "It's a comfortable place. Little snippets of life make it special," like the Goldson family boating or artist Vincent Smith at work (both below). Police chief Joseph Carter (top left) keeps tabs on town

elder Isabel Powell, self-professed maker of "wonderful lobster rolls and gorgeous Bloody Marys. I don't think of myself as Afro-American," she says. "I'm just an American on Martha's Vineyard. Period."





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so on and so on, resulting in a community that's thrived for generations.

Community is part of what attracted Tankard. "We were living in Newark, New Jersey, in 1967 when the riots started," she says. "I saw a neighbor get shot through the neck. 'We can't raise our children here,' I told my husband. We came here to start a new life."

At the first of the Heritage Trail's 16 sites—Shearer Cottage, the island's first inn opened by and for black people—we meet Doris Jackson, granddaughter of Charles Shearer, who opened the lodging in 1912.

Jackson turns nostalgic and rattles off the names of famous former guests. One, Isabel Powell, first wife of the late New York Congressman Adam Clayton Powell, Jr., still summers down the street in the home they bought in 1937. At 94, she's as live a wire as ever, holding court on her porch, offering visitors notoriously potent Bloody Marys.

"This is such a vibrant, self-affirming community of achievers," says journalist Jill Nelson, who is writing a history of her family's summers here. She is sitting in front of the house her parents bought in 1967 overlooking the town beach. "Having been here, I had no need to chant, 'I am somebody.' The high bar became the norm."

Now Oak Bluffs is home to the island's chapters of the NAACP and the Association for the Study of African American Life and History. It's also got an association of African-American women called the Cottagers, which hosts fund-raisers for island causes. For more than 15 years the Partnership, a group for black professionals, has held conferences here.

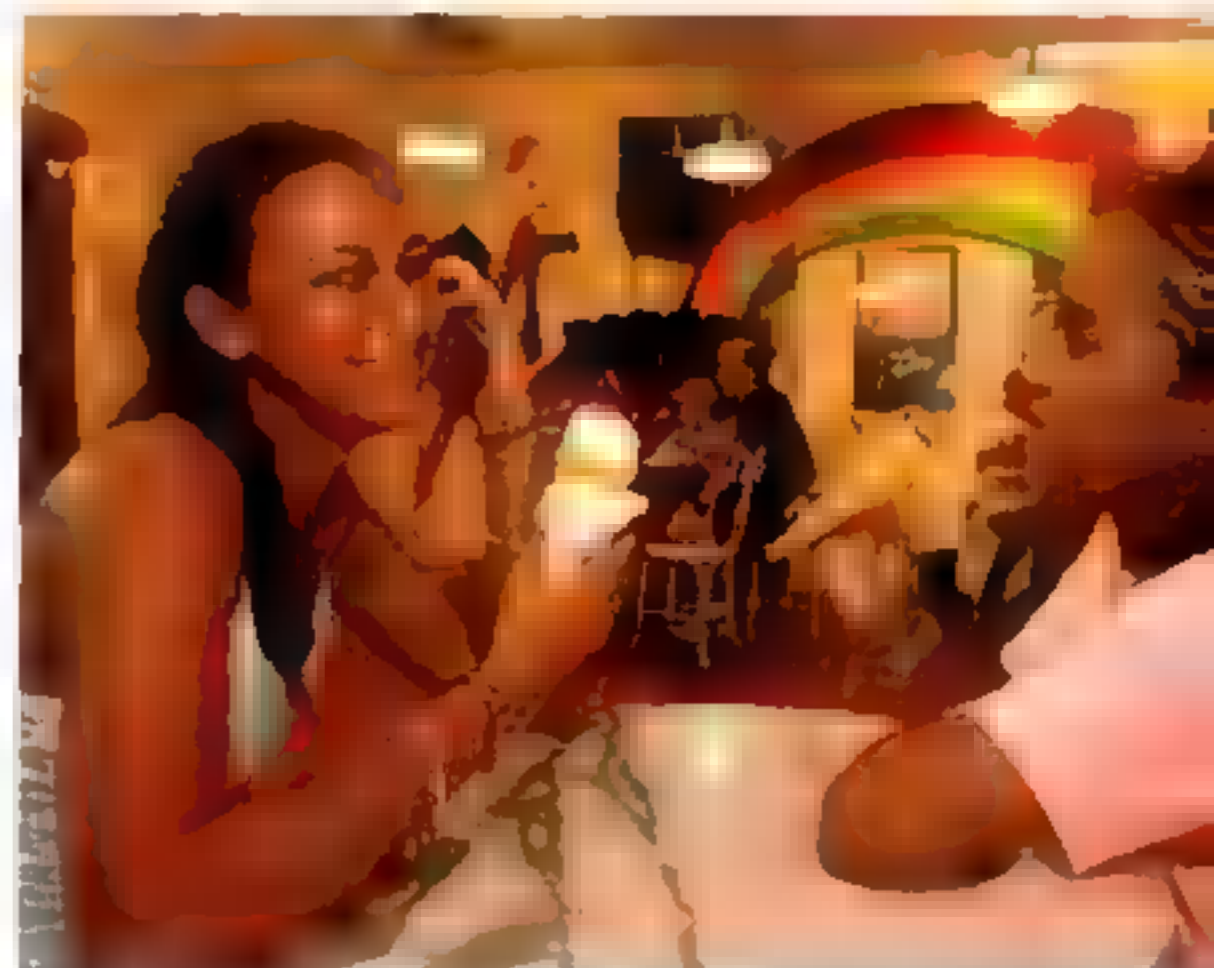
African Americans now live all over Martha's Vineyard, but Oak Bluffs remains their cultural heart and soul, a community both color blind and color rich. In the end you could be any color of the rainbow, and it would not matter to the environment here: these golden dunes, this salt breeze, these blue skies.

And, of course, the common denominator: the water that envelops the whole island like a sweet embrace. Several people invite me to participate in a baptism of sorts. So at 7:30 one morning, I join the Polar Bears, some 30 to 40 folks, mostly black, young and old, who meet at this time every summer day for a tradition that began in the 1940s. They congregate at a stretch of town beach, where a post-swim buffet is already set, full of sweet rolls, egg casseroles, grits, and coffee.

Holding hands, we listen to an invocation by the club leader, followed by an off-key rendition of the Dionne Warwick hit "That's What Friends Are For." Then we wade into the still but chilly water. Some do laps between the two jetties. Others form a circle for water aerobics. Still others stand, waist deep, and carry on about last night's party or yesterday's catch. I trade swimming tips with Ed Redd, a judge in Boston, whose gray-ing dreadlocks are tied back in a ponytail. He and his family bought a house here in 1982. "Sure, you have to have a certain pedigree to be here," he says. "But after that, it's like the water, the great equalizer. You sink or swim on your character."

The morning light bounces off the shimmering water and momentarily blinds me. Entranced, I say a little prayer that the dream of Oak Bluffs never fades. □

Their first summer in Oak Bluffs tastes sweet at Mad Martha's, where Jacquelyn Lewis, at left, and Leah Parker indulge in cones and phones. An added bonus: Movie director Spike Lee was also out for ice cream. "I asked him for a high five," says Parker. "I'm not afraid of famous people."



WEBSITE EXCLUSIVE

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GET OFF

(Okay, it may seem like I hate my parents, but I'm really demonstrating what a therapist would call "asserting my identity," so I can grow up to be a well-adjusted individual. Sure, I say I want freedom, but without parental supervision, I'm much more likely to smoke pot and stuff. I hope my parents don't try to act like my friends. What I really need is parents.)

MY BACK.

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BOUNDARY WATERS

Against the Grain

Minutes before darkness, a Canada goose prepares for sleep on an unnamed slough in northern Minnesota. If photographer Jim Brandenburg had waited any longer, he wouldn't have been able to produce a usable image without artificial light. Yet even in this shot, with an exposure that lasted at least two seconds, his digital camera's light receptors—more sensitive than the highest speed film—struggled to capture the failing twilight. That's what created the photo's dreamy, pixelated look.

Though some staffers thought the impressionistic effect was magical, Jim was surprised the picture came as close as it did to being included in the article. "I suppose the effect adds to the aesthetic for some people," he says, "but I would have preferred the image to look less grainy."

WEBSITE EXCLUSIVE

Cut it or keep it? Find out more about what tipped the balance for this photo and send it as an electronic greeting card at nationalgeographic.com/ngm/0306.



Breast Cancer Doesn't Just Affect Women

In the U.S. alone, 211,300 women will be diagnosed with breast cancer this year, and nearly 40,000 will die.*

Sadly, they won't be the only casualties. Consider the families and friends who survive them.

*We cannot rest until we win
the battle against breast cancer.*



THE BREAST CANCER RESEARCH FOUNDATION

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Prevention and

Evelyn H. Lauder, Founder ■ Chairman
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For more information, visit us online at www.bcrfcure.org
or call toll-free 1-866-FIND-A-CURE.

The Breast Cancer Research Foundation
Box 9236 GPO
New York, NY 10087-9236

A not-for-profit organization.

Photographer: Mary Ellen Mark Agency: badaleto | ginsberg, inc.

NG503

* Source of statistics: American Cancer Society

Tom and Amanda

ON A S S I

ON THE ROAD WITH THE FILM

PHOTOGRAPHY

Bugged in Australia

Working with butterflies and acid-squirting ants

Temperatures in the forest of Australia were hot, and the caterpillar—was refusing to cooperate. Still, photographer **Darlyne Murawski**, her head on a pillow and her back on a bench, patiently focused and snapped away as the caterpillar turned ant larvae into lunch.

"It's impossible to photograph this behavior inside an ant nest, so we used a glass plate," Darlyne says. Butterfly expert and self-described "ant and caterpillar wrangler" Rod Eastwood gently brushed the insects into place so Darlyne, lying beneath the glass plate, could get the striking image on pages 108-109.

A bigger problem: finding a caterpillar in the first place. "We had to open a hundred ant nests to find one caterpillar," she says. "These are really awful, acid-squirting, biting ants. We'd have hundreds crawling over us, and the pain was horrendous."

DAVID KOHMAN

NOVEMBER 8 - 19, 2000



Just
Mushroom

IGNOMINMENT

E D Y L A I H G I N L W O R L D



SCYTHIAN GOLD

Our Man in Russia

Writer gave stifled Soviets an uncensored voice

Back in the former U.S.S.R., veteran Russia hand **Mike Edwards**, far right, joined archaeologist Konstantin Chugunov and the magazine's Russian interpreter, Ludmila Mekertycheva, to look at maps of Scythian tombs in Tuva, the subject of his 50th *GEOGRAPHIC* feature article (good for second place among the magazine's living writers). With this story Mike retires from the magazine after 34 years, although he'll continue to contribute as a freelancer.



SISSE BRIMBERG

Before joining the magazine staff, Mike worked for newspapers in his native Georgia and in New York and spent six years as a Peace Corps administrator in Afghanistan, Jamaica, and Washington, D.C. The first of his 15 assignments in the former Soviet Union took him to Ukraine in 1987. "The trick back then was

getting an honest story despite the government minders," says Mike. "It really got exciting in '89. Suddenly people would talk to you. They weren't afraid anymore. Here were countries with voices that were struggling to come out." In these pages, Mike gave those long-silent voices a megaphone.

WORLDWIDE



NEHA DINGDEE

She was a throwaway, ■ newborn girl found beneath a bridge in rural northern India and taken to a shelter, where **William Albert Allard** (above) photographed her (see page 20). "Midwives earn more for disposing of ■ female baby than they do for delivering one," he says. Because contact

with blood is considered defiling to Hindus, most Indian midwives are Untouchables, but not all of them practice infanticide, Bill says. A midwife at this shelter was trying to convince colleagues that killing girls is wrong.

Writer **Ted Conover** expected danger while riding trucks across the Andes, but the Colorado native didn't expect altitude sickness. At 15,000 feet on the road from Lima to Cusco, it hit him: fever, nausea, diarrhea, vertigo, and ■ migraine. A fellow hitchhiker comforted him, mopping his brow. "She told me she'd been on a bus on the same road in the 1990s when Shining Path guerrillas made everyone get off, then shot ■ French couple before her eyes," he recalls. Suddenly Ted's altitude sickness—which lasted only ■ few hours—seemed like ■ minor inconvenience.

They asked God for ■ drummer, and they got one in author **Perry Garfinkel**. Perry was visiting a Pentecostal church in Oak Bluffs, the zip code on Martha's Vineyard that he covered for this issue, when he came upon a piano player practicing next to an unmanned drum set. "I told him I play the drums, and he said they'd been praying for ■ drummer," Perry says. "So I sat in with him and ■ guitarist the next Sunday." A ready writer as well as drummer, Perry has a long history on the Vineyard: He summered there in the 1970s, later lived there while writing ■ book, and spent two years in the 1990s as features editor for the *Martha's Vineyard Times*.

WEBSITE EXCLUSIVE

Find more stories from our authors and photographers, including their best, worst, and quirkiest experiences, at nationalgeographic.com/ngm/0306.



***There's a new and different way
to treat seasonal allergies.***

SINGULAIR IS THE ONLY SEASONAL ALLERGY MEDICATION THAT SPECIFICALLY BLOCKS LEUKOTRIENES. Many existing allergy medicines block histamine. SINGULAIR is different. It works by blocking leukotrienes (loo-koh-TRY-eens). Leukotrienes are an underlying cause of allergy symptoms. They are substances produced in your body that can make you feel uncomfortable during allergy season.

HELPS RELIEVE A BROAD RANGE OF SYMPTOMS. A single SINGULAIR tablet a day helps relieve a broad range of seasonal allergy symptoms for a full 24 hours. SINGULAIR is also available in a cherry chewable tablet for children 2 to 14 years of age. SINGULAIR should be taken once a day, as prescribed. SINGULAIR is available by prescription only.

IMPORTANT INFORMATION: In clinical studies, side effects were usually mild and varied by age, and included headache, ear infection, sore throat, and upper respiratory infection. Side effects generally did not stop patients from taking SINGULAIR. SINGULAIR should not be taken by people who are sensitive to any of its ingredients.

Ask your doctor about SINGULAIR for your seasonal allergies.
Call 1-888-MERCK-95, or visit singulair.com.

Please see the Patient Product Information on the adjacent page and discuss it with your doctor.



This product is available through the Merck Patient Assistance Program.
To find out if you qualify call 1-888-MERCK-56.

ONCE-A-DAY
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Patient Information
SINGULAIR® (SING-u-lair) Tablets, Chewable Tablets, and Oral Granules
Generic name: montelukast (mon-te-LOO-kast) sodium

Read this information before you start taking SINGULAIR®. Also, read the leaflet you get each time you refill SINGULAIR, since there may be new information in the leaflet since the last time you saw it. This leaflet does not take the place of talking with your doctor about your medical condition and/or your treatment.

What is SINGULAIR®?

- SINGULAIR is a medicine called a leukotriene receptor antagonist. It works by blocking substances in the body called leukotrienes. Blocking leukotrienes improves asthma and seasonal allergic rhinitis (also known as hay fever). SINGULAIR is not a steroid.

SINGULAIR is prescribed for the treatment of asthma and seasonal allergic rhinitis:

1. Asthma.

SINGULAIR should be used for the long-term management of asthma in adults and children ages 12 months and older.

Do not take SINGULAIR for the immediate relief of an asthma attack. If you get an asthma attack, you should follow the instructions your doctor gave you for treating asthma attacks. (See the end of this leaflet for more information about asthma.)

2. Seasonal Allergic Rhinitis.

SINGULAIR is used to help control the symptoms of seasonal allergic rhinitis (sneezing, stuffy nose, runny nose, itching of the nose) in adults and children ages 2 years and older. (See the end of this leaflet for more information about seasonal allergic rhinitis.)

Who should not take SINGULAIR?

Do not take SINGULAIR if you are allergic to SINGULAIR or any of its ingredients.

The active ingredient in SINGULAIR is montelukast sodium.

See the end of this leaflet for a list of all the ingredients in SINGULAIR.

What should I tell my doctor before I start taking SINGULAIR?

Tell your doctor about:

- **Pregnancy:** If you are pregnant or plan to become pregnant, SINGULAIR may not be right for you.
- **Breast-feeding:** If you are breast-feeding, SINGULAIR may be passed in your milk to your baby. You should consult your doctor before taking SINGULAIR if you are breast-feeding or intend to breast-feed.
- **Medical Problems or Allergies:** Talk about any medical problems or allergies you have now or had in the past.
- **Other Medicines:** Tell your doctor about all the medicines you take, including prescription and non-prescription medicines, and herbal supplements. Some medicines may affect how SINGULAIR works, or SINGULAIR may affect how your other medicines work.

How should I take SINGULAIR?

For adults or children 12 months and older with asthma:

- Take SINGULAIR **once a day in the evening**.
- Take SINGULAIR every day for as long as your doctor prescribes it, even if you have no asthma symptoms.
- You may take SINGULAIR with food or without food.
- If your asthma symptoms get worse, or if you need to increase the use of your inhaled rescue medicine for asthma attacks, call your doctor right away.
- **Do not take SINGULAIR for the immediate relief of an asthma attack.** If you get an asthma attack, you should follow the instructions your doctor gave you for treating asthma attacks.
- Always have your inhaled rescue medicine for asthma attacks with you.
- Do not stop taking or lower the dose of your other asthma medicines unless your doctor tells you to.
- If your doctor has prescribed a medicine for you to use before exercise, keep using that medicine unless your doctor tells you not to.

For adults and children 2 years of age and older with seasonal allergic rhinitis:

- Take SINGULAIR once a day, at about the same time each day.

- Take SINGULAIR every day for as long as your doctor prescribes it.
- You may take SINGULAIR with food or without food.

How should I give SINGULAIR oral granules to my child?

Do not open the packet until ready to use.

SINGULAIR 4-mg oral granules can be given either:

- directly in the mouth;
- OR
- mixed with a spoonful of one of the following soft foods at cold or room temperature: apple sauce, mashed carrots, rice, or ice cream. Be sure that the entire dose is mixed with the food and that the child is given the entire spoonful of the mixture right away (within 15 minutes).

IMPORTANT: Never store any oral granule/food mixture for use at a later time. Throw away any unused portion.

Do not put SINGULAIR oral granules in liquid drink. However, your child may drink liquids after swallowing the SINGULAIR oral granules.

What is the daily dose of SINGULAIR for asthma or seasonal allergic rhinitis?

For Asthma (Take in the evening):

- One 10-mg tablet for adults and adolescents 15 years of age and older.
- One 5-mg chewable tablet for children 6 to 14 years of age.
- One 4-mg chewable tablet or one packet of 4-mg oral granules for children 2 to 5 years of age, or
- One packet of 4-mg oral granules for children 12 to 23 months of age.

For Seasonal Allergic Rhinitis (Take at about the same time each day):

- One 10-mg tablet for adults and adolescents 15 years of age and older.
- One 5-mg chewable tablet for children 6 to 14 years of age, or
- One 4-mg chewable tablet or one packet of 4-mg oral granules for children 2 to 5 years of age.

What should I avoid while taking SINGULAIR?

If you have asthma and if your asthma is made worse by aspirin, continue to avoid aspirin or other medicines called non-steroidal anti-inflammatory drugs while taking SINGULAIR.

What are the possible side effects of SINGULAIR?

The side effects of SINGULAIR are usually mild, and generally did not cause patients to stop taking their medicine. The side effects in patients treated with SINGULAIR were similar in type and frequency to side effects in patients who were given a placebo (a pill containing no medicine).

The most common side effects with SINGULAIR include:

- stomach pain
- stomach or intestinal upset
- heartburn
- tiredness
- fever
- stuffy nose
- cough
- flu
- upper respiratory infection
- dizziness
- headache
- rash

Less common side effects that have happened with SINGULAIR include (listed alphabetically):

agitation including aggressive behavior, allergic reactions (including swelling of the face, lips, tongue, and/or throat, which may cause trouble breathing or swallowing), hives, and itching, bad/vivid dreams, increased bleeding tendency, bruising, diarrhea, hallucinations (seeing things that are not there), indigestion, inflammation of the pancreas, irritability, joint pain, muscle aches and muscle cramps, nausea, palpitations, restlessness, seizures (convulsions or fits), swelling, trouble sleeping, and vomiting

Rarely, asthmatic patients taking SINGULAIR have experienced a condition that includes certain symptoms

that do not go away or that get worse. These occur usually, but not always, in patients who were taking steroid pills by mouth for asthma and those steroids were being slowly lowered or stopped. Although SINGULAIR has not been shown to cause this condition, **you must tell your doctor right away if you get one or more of these symptoms:**

- a feeling of pins and needles or numbness of arms or legs
- a flu-like illness
- rash
- severe inflammation (pain and swelling) of the sinuses (sinusitis)

These are not all the possible side effects of SINGULAIR. For more information ask your doctor or pharmacist.

Talk to your doctor if you think you have side effects from taking SINGULAIR.

General information about the safe and effective use of SINGULAIR

Medicines are sometimes prescribed for conditions that are not mentioned in patient information leaflets. Do not use SINGULAIR for a condition for which it was not prescribed. Do not give SINGULAIR to other people even if they have the same symptoms you have. It may harm them. **Keep SINGULAIR and all medicines out of the reach of children.**

Store SINGULAIR at 25°C (77°F). Protect from moisture and light. Store in original package.

This leaflet summarizes information about SINGULAIR. If you would like more information, talk to your doctor. You can ask your pharmacist or doctor for information about SINGULAIR that is written for health professionals.

What are the ingredients in SINGULAIR?

Active Ingredient: montelukast sodium

SINGULAIR chewable tablets contain aspartame, a source of phenylalanine.

Phenylketonurics: SINGULAIR 4-mg and 5-mg chewable tablets contain 0.674 and 0.842 mg phenylalanine, respectively.

Inactive ingredients:

- **4-mg oral granules:** mannitol, hydroxypropyl cellulose, and magnesium stearate.
- **4-mg and 5-mg chewable tablets:** mannitol, microcrystalline cellulose, hydroxypropyl cellulose, red ferric oxide, croscarmellose sodium, cherry flavor, aspartame, and magnesium stearate.
- **10-mg tablet:** microcrystalline cellulose, lactose monohydrate, croscarmellose sodium, hydroxypropyl cellulose, magnesium stearate, hydroxypropyl methylcellulose, titanium dioxide, red ferric oxide, yellow ferric oxide, and carnauba wax.

What is asthma?

Asthma is a continuing (chronic) inflammation of the bronchial passageways which are the tubes that carry air from outside the body to the lungs.

Symptoms of asthma include:

- coughing
- wheezing
- chest tightness
- shortness of breath

What is seasonal allergic rhinitis?

- Seasonal allergic rhinitis, also known as hay fever, is an allergic response caused by pollens from trees, grasses and weeds.
- Symptoms of seasonal allergic rhinitis may include:
 - stuffy, runny, and/or itchy nose
 - sneezing

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Flashback



ERNEST B. SCHOEDSACK

BAGHDAD

Repeat Performance

Faisal I came to Iraq's throne with on-the-job experience. As prince of Mecca, he helped lead the Arab revolt in World War I and was later proclaimed king of Syria—until the French forced him out in 1920. When uprisings in Iraq persuaded occupying British authorities to find an Arab ruler, Faisal got another chance to be in charge. The British installed him as Iraq's king in 1921, establishing a Hashemite monarchy in Baghdad that lasted until his grandson's assassination in 1958. This photograph of Faisal and his pet leopard was made in his palace courtyard in 1925.

WEBSITE EXCLUSIVE

You can send this month's Flashback as an electronic greeting card and access the Flashback photo archives at nationalgeographic.com/ngm/flashback/0306.



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